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JPRS 84737

14 November 1983

# China Report

ECONOMIC AFFAIRS

No. 398

ENERGY: STATUS AND DEVELOPMENT -- XXII

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## ENERGY: STATUS AND DEVELOPMENT -- XXII

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HONG KONG MEDIA ON CHINA

SINO-JAPANESE COOPERATION ON CHINA'S OFFSHORE OIL BOLSTERS ECONOMIC TIES

HK060909 Hong Kong TA KUNG PAO in Chinese 6 Sep 83 p 2

[ "Special Dispatch column" by Li Wei-ching [2621 4850 1987]: "China, Japan Cooperate To Exploit South China Sea Oil" ]

[Text] First Time for Japanese Oil Company To Obtain Rights

Two Japanese oil companies submitting tenders for oil exploitation in China's sea areas yesterday signed contracts with China to take part officially in oil exploitation in the south China Sea.

The Japan National Oil Corp. got a 1,283-square km block in the Pearl River mouth Basin. What is noticeable is that this is the first oil company which has independently obtained such rights in the course of tendering for oil exploitation in China's sea areas. A consortium consisting of The Idemitsu Oil Development Co. Ltd. of Japan, Natomas Ltd. of the United States, and the Cluff Oil Co. of the United Kingdom, was awarded a 963-square-km block in the Beibu Gulf of the South China Sea.

The news that the Japan National Oil Corp. and the Idemitsu Oil Development Co. will obtain the rights has been circulating for quite some time. According to some people in oil circles, China and Japan have had a tacit mutual understanding that the contracts will be officially signed at the third Sino-Japanese conference of government members. This indicates that both the Chinese and Japanese governments are attaching great importance to the signing of the contracts and have upgraded the signing to an issue between two countries rather than between two companies. The Chinese side also expressed that the contracts signed between the two countries will promote friendly cooperation and economic and technological cooperation between the two countries.

At present, about 99 percent of crude oil consumed in Japan comes from foreign countries. Therefore, Sino-Japanese cooperation on oil exploitation in the South China Sea indicates that Japan places great hopes on commercial crude oil supplied by China in the future and that China is willing to cooperate with Japan again on oil exploitation in the South China Sea following their cooperation in the Bohai Sea.

## "Blood Pipelines" in the Middle East Are on Decline

As far as the supply of crude oil is concerned, Japan has to depend mainly on Middle East countries. Due to various complicated factors, however, "blood pipelines" in the Middle East are now on a downward trend. The Japanese Government fully understand that in the 1980's, Japan must gradually turn to Asia for its oil supply. At present, Indonesia tops Asian countries in supplying crude oil to Japan, accounting for 14.3 percent of Japan's total oil imports. China accounts for 3.6 percent, compared with Brunei's 3.1 percent, Malaysia's 2.4 percent, and a small amount from Burma.

Japan's economic experts hold that Japan's further participation in oil exploitation in the Bohai Sea and the South China Sea indicates that in the next 3 to 5 years, Japan's oil companies will lay stress on their independent oil exploitation in foreign countries. Hence, oil reserves in China's sea areas are highly valued.

On the whole, there are two opinions on the Japan National Oil Corp. and the Idemitsu Oil Development Co.'s obtaining the rights for oil exploitation:

1. Judged by the contracts already signed, China prefers selecting consortiums. But, nothing is immutable and China will adopt flexible policies. Taking the Japan National Oil Corp. as an example, as it is supported by the state and runs no financial risks, so China is willing to let it obtain the rights independently, thus denying the rumor of the cooperation between the Japan National Oil Corp. and the Getty Co. of the United States.

Originally, Japan's Idemitsu consortium consisted of the Idemitsu Co. of Japan and the Natomas Co. of the United States. But yesterday's news release disclosed that the Cluff Oil Co. of the United Kingdom, which intended to tender for oil exploitation independently, had joined the joint operation and that Idemitsu will remain operator of the consortium.

## Sino-Japanese Relations Will Be Pushed to a New Peak

2. China has done its utmost to prevent the phenomenon of one or two companies obtaining all rights in signing the fourth batch of contracts with the Japan National Oil Corp. and the Idemitsu Oil Development Co., for all four companies involved are new participants.

Reportedly, the attention of people in oil circles will be drawn to the Chevron-Texaco consortium (United States), The Sun Orient-Getty consortium (United States), and the Amoco Orient Petroleum Co. (United States), which have submitted tenders independently.

With the participation of two Japanese oil companies in oil exploration and exploitation in the South China Sea, a responsible person of the Japan National Oil Corp. even describes China's offshore oilfields as Japan's best hope for the future. It is thus envisaged that the Sino-Japanese cooperation on oil exploitation in the South China Sea will push economic relations between China and Japan to a new peak.

NATIONAL POLICY

REGULATIONS ON WATER CONSERVANCY, HYDROPOWER PROJECT MANAGEMENT ISSUED

Beijing SHUILI SHUIDIAN JISHU WATER RESOURCES AND HYDROPOWER ENGINEERING  
in Chinese No 7, 20 Jul 83 pp 4-8

Text Ministry Decision To Issue Regulations

Ministry of Water Resources and Electric Power Decision To Issue "Regulations on Management of Water Conservancy and Hydropower Projects

To all provinces, autonomous regions, and centrally subordinate municipality water conservancy and hydropower bureaus and offices and electric power offices, all river valley management organizations, all electric power industry management offices, the Danjiangkou and Panjiakou key water conservancy projects management offices, the General Office of Water Conservancy and Hydropower Construction, all water conservancy and hydropower surveying and design academies, all water conservancy and hydropower engineering offices, and all key hydropower stations.

In order to strengthen the management of water conservancy and hydropower projects, we now issue the "Regulations on Management of Water Conservancy and Hydropower Projects" in the expectation that they will be conscientiously implemented.

Water conservancy and hydropower projects are key undertakings for guaranteeing economic development and the security of the people's lives and property, as well as key measures for utilizing water resources to develop the national economy. Water conservancy and hydropower management departments at all levels must take practical steps to strengthen management of existing projects, make thorough use of their benefits, and increase economic results so that they will be able to serve industrial and agricultural production and the urban and rural people's livelihood more effectively and will promote the continuous development of the socialist economy.

The Ministry of Water Resources and  
Electric Power. 20 April 1983

## Project Management Regulations

### Regulations on Water Conservancy and Hydropower Project Engineering

#### Section 1. General Principles

Article 1. Water conservancy and hydropower projects are major undertakings for comprehensive use of water resources to develop the national economy, major projects which protect economic construction and the security of the people's lives and property, and valuable assets of the nation and the people. In order to strengthen management of water conservancy and hydropower projects and make thorough use of their economic benefits, these regulations have been drafted.

Article 2. These regulations apply to all types of water conservancy and hydropower projects under water conservancy and hydropower departments at all levels.

Article 3. As used in these regulations, "water conservancy and hydropower projects" refers to:

- a. Flood and tide control projects;
- b. Agricultural irrigation projects;
- c. Hydroelectric projects;
- d. Drainage, standing water prevention, and salinization control projects;
- e. Urban and industrial water supply and other water conservancy and hydropower projects

Article 4. Water conservancy and hydropower projects built with state investments are owned by all the people and managed by the state; some may be turned over to collectives for management.

Water conservancy and hydropower projects run by the people and subsidized by the state or constructed with funds raised by communes or brigades are under commune or brigade collective ownership and are managed by the collectives; if necessary, some of these may be managed by the state.

Article 5. The basic task of water conservancy and hydropower project management bodies is to assure project security, to thoroughly utilize project benefits, to actively develop comprehensive operations, to continually raise the level of scientific management, to serve industrial production and the livelihood of the urban and rural people, and to promote the socialist economic development.

Article 6. All cognizant organizations in water conservancy and hydropower at all levels and all water conservancy and hydropower project management bodies must conscientiously strengthen project management, establish technical files, draft relevant technical management guides or detailed implementation regulations, and strive to raise the scientific and technical level of management, in accordance with the system of rules and regulations issued by the Ministry of Water Resources and Electric Power with regard to project

management. In addition, functional management affecting other departments must be carried out in accordance with the technical rules and regulations of these departments.

Water conservancy and electric power cognizant organizations at all levels and water conservancy and hydropower project management bodies must systematically train project management specialists and strengthen the technical training of employees.

## Section 2. Protection of Water Conservancy and Hydropower Projects

Article 7. All types of water conservancy and hydropower projects must delineate a protective area in accordance with management needs, natural and geographical conditions, historical circumstances and the specific social and economic situation.

Protective areas are classified as installation management areas, reservoir management areas, dike protection areas, and canal protection areas.

- a. Installation management areas shall be delineated around dams, spillways, aqueducts, power plants and irrigation and drainage installations.
- b. Reservoir management areas shall be delineated within population resettlement lines or land procurement boundaries surrounding reservoirs.
- c. Dike protection areas shall be delineated on both sides of river dikes.
- d. Canal protection areas shall be delineated on both sides of irrigation and drainage canals or their embankments.

The protective areas shall be designated by the project management bodies following discussion with the departments involved in these projects, application to the local people's governments in whose jurisdiction they are located, specification of their boundaries, posting of notices and issuance of certificates.

In case of projects with far-reaching effects, they shall be established by discussions of the higher-level cognizant body and the relevant people's governments.

Article 8. The land and objects on it within the management areas belong to state-managed projects and are under ownership of all the people, while the use rights belong to the project management organizations; in the case of collectively managed projects, the ownership belongs to the collective and utilization rights belong to the project management body. No other units or individuals may encroach upon them, and any encroachments must be restored.

In projects of which the project management groups have already taken control, if the land within the management area is to be transferred to a different system of ownership, the project management organization files an application in accordance with the established land transfer procedures.

Ownership and use rights of land and objects on it within dike protection and canal protection areas generally are unchangeable; if they must be transferred to ownership by all the people, this must be done in accordance with the preceding paragraph.

Article 9. In order to protect water conservancy and hydropower projects and their associated installations and facilities, the following are prohibited:

- a. destroying of project installations such as dams and embankments, power stations, water channels and sluice gates or their associated observation, hydrographic, communications, electrical transmission, transformer and transport facilities;
- b. reclamation, cutting of turf, or indiscriminate felling of protective forests on embankments or water channels;
- c. establishing structures which are harmful to the safety of embankments;
- d. misappropriation or unauthorized use of water conservancy or hydropower goods, equipment or facilities;
- e. catching of fish by the use of explosives, poisons or indiscriminate use of electricity in water areas;
- f. driving of caterpillar tractors, hard-wheeled vehicles or overweight vehicles on dams, embankments, or sluice gate access bridges, or driving on dams or embankments without road surfaces after rain;
- g. stringing broadcast wires over communications or flood reporting lines of project management units;
- h. carrying out blasting, sinking of wells, burials, quarrying of stone and removal of earth and sand, construction, wanton cutting of wood, and other dangerous activities within the protective areas.

Article 10. In order to maintain the capabilities of water conservancy and hydropower projects, the following activities are prohibited:

- a. construction of buildings and installations which affect the passage of water on flood diversion, drainage and aqueduct channels and canals;
- b. unauthorized building of reclamation dikes on riverbanks, lakes, flood catchment areas, flood diversion areas, reservoir areas, and seashore areas near river mouths;
- c. building water diversion or water blocking installations which hinder navigation or present a danger within river channels;
- d. removal of sand and gravel or earth from river flood areas or banks where this endangers projects;

e. planting tall trees on river flood land, canals, flood diversion areas and flood diversion channels;

f. dumping of trash, rubble, tailings and mine spoil or miscellaneous objects in the water areas of flood lands or reservoirs, rivers, canals or lakes.

Article 11. When there is a genuine need to carry on construction within the protective areas of water conservancy or hydropower projects, the agreement of the cognizant organization must be secured, and also that of the relevant navigation or forestry management organizations in the case of rivers used for navigation or log drives, and authorization must be secured according to the established procedure.

Structures, plants, trash, coal residue, tailings and spoil, miscellaneous objects and other emplacements which block water within the protective areas of water conservancy and hydropower projects must be removed or reconstructed by the unit which located them there, and the original capabilities of the facility must be restored by a specified deadline. If structures or facilities built with permission block the water, negotiations on dealing with them must be carried out by the concerned parties.

Article 12. Water conservancy and hydropower project management bodies must act in accordance with environmental protection and forest protection regulations, coordinate with the relevant departments, protect the environment, and prevent water pollution.

Article 13. In keeping with the scale and importance of projects, water conservancy and hydropower project management units may organize militia protection. Following reporting and authorization, protection by people's economic police or assigned PLA detachments may be established for critical locations or key objectives.

In the case of key water conservancy or hydropower projects in complex public safety conditions, with permission of the province, autonomous region or directly subordinate municipality people's government, public security stations may be established.

### Section 3. Comprehensive Utilization of Water Conservancy and Hydropower Projects

Article 14. In keeping with design principles and actual circumstances, water conservancy and hydropower projects should conduct management and utilization activities as follows:

a. Comprehensive-use water conservancy and hydropower projects should have their benefits thoroughly used in accordance with design specifications and rational utilization;

b. In relation to flood protection or flood drainage aspects of projects, the principles of subordinating lesser interests to greater and partial interest;

concerns to overall concerns should be followed, comprehensive planning conducted, and the relationships between upstream and downstream areas and between both banks correctly handled in order to achieve organization of all aspects and rational utilization.

c. In the case of large and medium-sized reservoirs, hydroelectric stations, river embankments, sluice gates, and small-sized reservoirs affecting the security of cities and towns, railroads, highways and mines, every year an annual or stage-by-stage management and use plan must be drafted, which must be carried out by the project management organizations after reporting to the higher levels and securing their authorization.

d. River embankments must be well maintained and well handled during floods and their flood handling safety must be guaranteed within the specified antiflood specifications.

e. Hydropower stations connected to the power grid must, in accordance with the principle of comprehensive utilization, participate in power and energy balancing in accordance with a management and use plan and must be subordinated to the overall power grid dispatching.

f. During the larval seasons of fish and crabs, coastal and river and lake sluice gates must, to the extent possible, be opened at suitable times to the river or lake in order to allow the fry to enter and to assure reproduction of aquatic product resources.

g. In the case of transport or log drive rivers, the project management bodies must as far as possible provide suitable conditions for these activities, and the transport and logging departments must respect and care for the facilities and protect them from damage.

h. In drought years, when the water is insufficient to meet needs, but as a result of special necessity the use of projects must continue, the safety of the structures and machinery and equipment must be protected and the minimum needs of key water using units, as well as the minimum requirements of fishery production and of the environment and tourism must be taken into account.

Article 15. In flood season, water conservancy and hydropower projects with flood protection tasks should, under the guidance of the local people's governments, establish antiflood command organizations and antiflood organizations; flood-period management should be in accordance with authorized management and use plans and should be subordinate to unified command by the higher level antiflood command organs. No organization or individual may take it upon himself to change the authorized plan and engage in unauthorized management.

Article 16. When floods in excess of specifications or unforeseen events which threaten the safety of the projects occur and communication with the higher levels is lost, the projects' on-site antiflood command organs may, in accordance with a program approved by the higher level cognizant department,

take extraordinary measures to assure the safety of dams and embankments and should use all possible avenues to report the danger to areas downstream and to warn the masses in endangered areas to evacuate.

Article 17. Management of boundary water conservancy and hydropower projects.

a. The management of projects on the boundaries of administrative areas must strictly follow the uniform water conservancy and hydropower regulations, and agreements and relevant decisions jointly worked out by the concerned parties.

b. On boundary rivers in plains areas, without a unified plan and the agreement of both parties, the upstream areas is not permitted to increase drainage or diversion of water, and the downstream area may not set up facilities that block the flow or decrease the river's drainage capacity.

c. When embankments are or dams are built on boundary rivers, all activities which involve changes in flood protection or drainage specifications or which affect the variation of the water level or change the boundaries of the river valley must be subject to unified planning, and approval for them must be secured through the prescribed procedures before they may be carried out.

d. Construction of water conservancy or hydropower projects on boundary rivers without unified planning and agreement between the two parties which lead to disputes should be reconsidered under the auspices of the higher-level cognizant body, and permission should be issued under the established procedures; in circumstances where it is merited, these projects should be torn down, rebuilt, or other necessary measures taken.

e. If differences of opinion arise during implementation of agreements, unity and a spirit of concession should be displayed and the parties should move to negotiations; when necessary, they may report to a higher-level cognizant organ for arbitration. Neither side may take it upon itself to change the agreement.

Article 18. The cognizant organs for water conservancy and hydropower should strengthen water supply management.

a. The units involved in water use should draft water use plans and submit water use applications to the water conservancy and hydropower project management organs. In accordance with the engineering plan, the water resources situation and weather and hydrological forecasts, and in keeping with the principle of assuring key needs while taking account of the entire situation, the project management units should first carry out an overall balancing of the various units' water use plans, report the result to their cognizant organizations for approval, then allocate water in accordance with the balanced plan.

e. Planned water use and rational allocation of water should be practiced in agricultural irrigation. Every effort should be made to increase the utilization rate of irrigation water, irrigation methods should be improved, and irrigation quality upgraded.

c. Water use by cities and mining and manufacturing enterprises should be agreed on with the project management units. Water within plan limits should be supplied by the management units in accordance with agreements. When there is a water shortage as a result of natural causes, a decrease in water supply may be deliberated. Water intake locations should be controlled by the project management units, and water metering equipment should be installed.

Industrial water-using units must have production-use water quotas, and water meters must be installed on the main water-using equipment; an effective specific water consumption accounting system must be established.

d. Units which have not submitted a water use plan and water use application should not be supplied with water. In the case of units which use water in excess of plan, which deviate from agreement, or which seriously waste water, the project management unit has the right to limit water supply, raise fees, or even withhold water.

e. Without the agreement of the original approving body, no unit or individual may change a plan, interfere with or hinder management personnel performing their duties, block or take over water sources, dig nonapproved water intake passages, increase water intake, or violate water use procedures.

#### Section 4. Management

Article 19. Some water conservancy and hydropower project management units are service-type units and some are enterprise-type units. They must strengthen their management, carry on economic accounting, and increase economic results.

Article 20. Every year, the cognizant organization must hand down annual task quotas to the water conservancy and hydropower project management units in accordance with their individual characteristics. Based on these quotas, the management units will draft annual plans, which are implemented after reporting to the cognizant organs for approval.

Article 21. The project management organs must strengthen their management of water resources, thoroughly utilize the economic benefits of project facilities, and increase their receipts; they should carry out other types of comprehensive operations in order to create wealth for the country and gradually improve employee living conditions.

Article 22. Water conservancy and hydropower project (including water supply and electric power supply) management units should collect water use fees from water-using units and electricity fees from electricity-using units.

a. Water fee collection standards should be based on production costs and should be set to provide suitable accumulation, following the principle of compensating shortages from abundance. Water fee standards for agriculture, industry and municipal uses should be differentiated.

Electricity fees should be based on kilowatt-hours and state-designated electricity prices.

b. Water and electricity-using units should make timely remittances to water conservancy and hydropower project (including water supply and electric power supply) units in accordance with specified payment procedures. If these are not paid on time, the unit collecting the fees may collect late charges; if requests for payment are ineffective, they may suspend water or power supply. No unit or individual may be exempted from water or electricity fees without authorization.

c. Agricultural water-use fees must be collected in cash, except that in areas where it has been the custom to accept grain as payment, grain may still be accepted as part of payment. The water fees must be collected by the project management unit, or by agreement, the local relevant departments or the Agricultural Bank may collect them.

d. Matters regarding fees for small facilities under collective management should be determined by the communes and brigades themselves.

Article 23. Comprehensive operations should be subjected to unified planning by the project management unit. The management unit may operate these operations itself or may sign an economic contract with the relevant departments for cooperative or joint operation; they must take account of the interests of the relevant communes and brigades and act in a way that promotes unity and production.

Article 24. Provided that they carry out state policy and orders and complete their state plan assignments, water conservancy and hydropower project management units have operating autonomy, and no unit or individual may transfer personnel or funds from the project management organizations without authorization, apportion irrational expenditures to them, or cut or reallocate their resources, equipment and products without compensation.

a. Management by water conservancy project management units

(1) Based on their income from water fees and comprehensive operations, after discussions with the cognizant organization or the financial departments, they may implement financial performance contracting and retention of cash surpluses. The cash surplus from the performance contract which is retained in accordance with regulations must be used to establish a production development fund, a collective welfare fund, and an employee bonus fund, which shall be allocated by the water conservancy project management organization and cannot be transferred to other uses. Funds which are to be paid to higher-level state financial organs in accordance with regulations must be remitted on time. In the case of small hydropower stations built by communes and brigades, the income goes to the collective.

(2) Under state plan guidance, water conservancy project management units have autonomy in production plans, funds allocation, procurement, product marketing and hiring in terms of qualifications.

b. The management work of hydropower project management units shall be carried out in accordance with the regulations of the cognizant hydropower organization regarding enterprise management.

## Section 5. Organizational System

Article 25. The Ministry of Water Conservancy and Power and its river valley organizations established for the main rivers, the power industry management offices in the large regions, the various people's governments' water conservancy or hydropower offices and bureaus at all levels, and the province and autonomous region electric power offices are the cognizant organs for water conservancy and hydropower project management and are responsible at their respective levels for managing all of the country's water conservancy and hydropower projects.

Article 26. The management of rivers on the national borders and water conservancy and hydropower projects on them are subject to separate regulations.

## Article 27. Management organs and their functions

a. State-built and collective-built water conservancy and hydropower projects must all have an established management body or designated management persons; having no managers is not permitted.

b. In the case of state-managed water conservancy and hydropower projects, the level at which the projects are managed is the level responsible for establishing the management body. In the case of collective-managed projects, the commune or brigade must establish a management body or specific management personnel.

When necessary the province, autonomous region or directly subordinate municipality may establish water conservancy project management organs within their borders for each drainage system and manage water conservancy projects in these drainage systems under the leadership of the province, autonomous region or municipality people's government.

c. A plan for the management bodies or the staffing of state-managed water conservancy projects shall be presented by the cognizant organ in keeping with the "Trial Standards for Drafting of Personnel Assignment by Water Conservancy Project Management Organizations" issued by the former Ministry of Water Conservancy, which shall be implemented after submission to the relevant levels of the management system and approval.

d. In the project construction process, the cognizant organization must make plans to establish management organs and assign management personnel in accordance with an approved staffing program.

e. The specific duties of the various types of project management organs shall be specified by the Ministry of Water Conservancy and Power through issuance of the relevant project management principles or regulations.

f. Where necessary, water conservancy project management units may organize management committees in which the masses in the area which are benefited and the organizations which are benefited participate, in order to achieve democratic management.

Article 28. Management and maintenance personnel needed for mass-style management organizations of irrigation area or watercourse embankments shall be provided by the communes and brigades which benefit from them, and the management responsibility system shall be applied.

Article 29. The labor, materials and equipment, labor production facilities, transport vehicles and the like needed by water conservancy and hydropower project management units shall be included in the plans at the various levels following consultation between the cognizant organs and the departments involved, and shall be provided in unified fashion by the management systems at the various levels.

The employees and temporary workers of state water conservancy and hydropower management units shall enjoy the relevant insurance and benefits prescribed by the state.

#### Section 6. Supplement.

Article 30. The design and construction of water conservancy and hydropower projects should create the necessary conditions for management work, and only when the projects are completed and pass tests can they be handed over for management; if they have not been completed in accordance with design specifications, if finishing work remains undone or if there are major defects, the water conservancy or hydropower project management unit has the right to refuse to accept them and the construction unit must take responsibility for their thorough completion.

In the case of all existing water conservancy or hydropower projects which have unfavorable effects on shipping, power generation, product production, log drives or other activities, corrective or improvement measures should be studied and proposed by the original builder organization together with the relevant departments.

Article 31. All violators of articles 9, 10, 11, 15, 17 and 18 of these regulations should receive criticism and education or administrative disposition by the relevant management organizations, and those that have caused losses should be required to make suitable compensation. Serious cases should be handled by the judicial departments.

Article 32. The water conservancy and hydropower management organizations of the governments of the provinces, autonomous regions and municipalities

may draft specific implementation regulations in keeping with these regulations and implement them following approval by established procedures.

Article 33. These regulations will go into effect on the date of issuance.

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POWER NETWORK

LIAONING 500KV POWER TRANSMISSION PROJECT NEARING COMPLETION

Shenyang LIAONING RIBAO in Chinese 8 Jun 83 p 3

[Article by Han Chunsheng [7281 2504 3932]: "'Yuan-Jin-Liao-Hai' 500KV Extrahigh Tension Power Transmission, Transformer Project Accelerated"]

[Summary] Work on the 'Yuan-Jin-Liao-Hai' [for Yuanbaoshan-Jinzhou-Liaoyang-Haicheng] 500KV extrahigh tension transmission and transformer project, which stretches across southwestern Liaoning all the way to eastern Nei Monggol is being accelerated, and the greater part of project has been completed. Begun in 1979, more than 80 percent of the total work involved had been completed by May 1983. Erection of the pylons is in the final stages and equipment for two of the three substations has been installed. The entire system is slated for completion in 1985.

The total investment in this project, one of 70 key construction projects throughout the nation, comes to 364 million yuan. The transmission line, over 600 kilometers in length, runs from Yuanbaoshan in Nei Monggol, through Jinzhou, to Liaoyang and Haicheng, spanning numerous rivers and crossing many mountain ranges along its way. After completion and commissioning, power from the pit-mouth power plant at Yuanbaoshan will be transmitted to western and southern Liaoning to ease the power shortage in these regions.

Chinese-designed, this line is the first 500KV extrahigh tension project to employ domestically manufactured equipment. Personnel from the power transmission and transformer companies involved have managed to accelerate construction while assuring quality engineering. Now in use with stepped-down loads are the sections between Yuanbaoshan and Jinzhou and Jinzhou and Liaoyang. Most of the section between Jinzhou and Haicheng has been completed and the section between Liaoyang and Haicheng is scheduled for completion in the spring of 1984.

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POWER NETWORK

BRIEFS

500KV HIGH-TENSION PROJECT--The Yuanbaoshan-Jinzhou-Liaoyang-Haicheng 500,000-volt ultrahigh voltage transmission line, with a total length of 602 kilometers, looms dragon-like against the sky. After more than 3 years of intensive work, the Yuanbaoshan-Jinzhou-Liaoyang section is beginning to be used for power transmission. Besides the putting up of lines, this project includes the building of three 500,000-volt transformer stations. This major power transmission artery when completed, will transmit up to 10 billion kwh a year from two large thermopower plants now under construction, namely the Yuanbaoshan Power Plant in Nei Monggol and the Jinzhou Power Plant in Liaoning, to the power-deficient industrial cities in central and southern Liaoning, such as Shenyang, Liaoyang, Fushun, Anshan, and Benxi. [Text] [Taiyuan SHANXI RIBAO in Chinese 24 July 83 p 3] 9411

YUNNAN'S LARGEST 220KV SUBSTATION COMPLETED--Ma'anshan, Yunnan's largest 220KV substation, officially began operations on 3 September 1983 and is now supplying a steady current to the Kunming Sodium Tripolyphosphate Plant. The Ma'anshan substation is a support facility for the Kunming Sodium Tripolyphosphate Plant, a key national construction project, and includes the 220KV Ma'anshan transformer station, the 220KV Wenquan-to-Ma'anshan 18-kilometer power transmission line and the Anning-to-Haikou 3.75-kilometer hook-up consisting of a double 110KV line. The design of this project was handled by the Yunnan Electric Power Design Institute, while the Provincial Transmission and Transformer Electrical Engineering Company and the Kunming Power Supply Bureau handled the building and construction end of things. In order to resolve the Kunming Sodium Tripolyphosphate Plant's power needs, the units involved in the design and construction of this project developed a spirit of unity and cooperation, overcame numerous problems, and completed their mission 2 weeks ahead of schedule. [Excerpt] [Kunming YUNNAN RIBAO in Chinese 8 Sep 83 p 1]

CSO: 4013/18

## HYDROPOWER

LI PENG OUTLINES CHINA'S POLICIES AND STRATEGIES FOR HYDROPOWER DEVELOPMENT

Beijing SHUILI FADIAN [WATER POWER] in Chinese No 7, 12 Jul 83, 1983 pp 1-5

[Article: "China's Policies for Hydropower Development and Strategic Measures for Speeding up Hydropower Construction--Comrade Li Peng's [2621 7720] Speech at Working Conference Sponsored by Water Conservancy and Hydropower Construction Corporation on 3 February 1983 (Abstract)"]

[Text] At the Twelfth National Congress of the Chinese Communist Party, it was decided that for the next twenty years of the four modernizations construction program, energy is to be regarded as the strategic keystone of economic development; and electric power is a key component of energy sources, i.e., it is a chief component among various key factors. Without electric power, it is difficult to build the four modernizations. Based on foreign and domestic practical experiences, power industry should always lead the national economy, and its growth rate should always be greater than that of the national economy. One major policy that will play a decisive role in allowing the power industry to take the lead lies in the decision to maximize the construction of hydropower and gradually shift the focal point of development on to hydropower. In order to speed up hydropower, it is imperative to formulate correct guidelines, policies and measures in accordance with actual conditions in our country. Thus, I would like to focus on guidelines for power development and strategic measures for accelerating hydropower construction.

### 1. Guidelines for Developing Hydropower

(1) Selective development. China has rich hydropower resources, 380 million kilowatts of which can be harnessed. Some 22 million kilowatts have been developed and more than 10 million kilowatts are currently under development, accounting for only approximately 10 percent of the total amount of harnessable hydropower resources, which is very low as compared with developed countries. At present, our immediate task is to select sites that are favorable for development of hydropower, and proceed with the development work on priority basis. By favorable conditions, I mean, first of all, good economic indices, great generating capacity and work power, low building cost per kilowatt, and low investment per kilowatt-hour. Besides, inundated land losses must be minimal, i.e., as China has a large population with little land, it is extremely important

to find ways of developing hydropower with minimal losses due to inundation. Moreover, power stations must be built as close as possible to load centers so as to cut down transmission distances. Fourth, good transportation and communications conditions which are conducive to the improvement of construction conditions. It is now generally believed that the best river sections for development are: The upper reaches of the Huang He, i.e., from Longyangxia to Qingtongxia, where more than 10 million kilowatts can be continuously developed; Hongshui River Basin, i.e., from Lubuge to Datengxia where almost 10 million kilowatts can also be continuously developed. Elsewhere, the upper course of the Di'er Songhua Jiang already has Fengman, and efforts are currently underway to build more hydropower stations at Baishan and Hongshi; cascade dams are being built on the upper course of the river. Abundant hydropower resources can also be found in the middle and upper courses of the Chang Jiang, and the geographical location is just right; Three Gorges is a gigantic project that has attracted worldwide attention, although many Chinese hydropower workers have been preoccupied with it for decades. In sum, we must selectively develop hydropower by investing our limited capital funds in optimum hydropower projects.

(2) Open up prospects for hydropower construction by developing several large-scale key projects. We must have large-scale key projects. Building on the present foundation, we hope to add new hydropowers amounting to more than 40 million kilowatts by the end of this century, including approximately 10 million kilowatts of small-scale hydropower, and over 30 million kilowatts of large-and medium-scale hydropower. Of course, this is only a tentative idea, although to a certain extent it is based on facts. First, in the past decade, some 10 million kilowatts were under construction; with insured investments and sound management in all aspects of operation, it is basically possible to put the 10 million kilowatts to work in the first 10 years. In the next 10 years, we intend to develop 20 to 30 million kilowatts. Based on the construction period of large-and medium-scale hydropower engineering work, most of the 20 million kilowatts projects should start in the first 10 years. At present, we are shooting for roughly 30 million kilowatts in our plans, i.e., most of the projects in our plans have to begin in the first 10 years. This includes the following large-scale key projects which can reach the combined capacity of over 20 million kilowatts: Chang Jiang's Three Gorges where the low dam's capacity is projected at 13 million kilowatts; Ertan's 3 million kilowatts; Longtan's 4 million kilowatts; as well as over 1 million kilowatts from several cascade dams on the upper Huang He and Fujian's Shuikou. Thus, by building some large-scale key projects in the first 10 years, we can get a good foothold and proceed with the objectives of the last 10 years with confidence. Then, depending on the financial and economic conditions of the nation in different periods of time, we should continuously add on some medium-scale projects; if such projects were to be put off until the next 10 years, it will be very difficult to complete them within this century, which will also present some difficulties to the objectives of the last 10 years. This is a strategic idea; we must not lose this opportune moment. Of course, we should start the large-scale projects one by one, not all at the same time.

3) Develop small-scale hydropower. China has relatively rich water resources for small-scale hydropower. Based on initial surveys, out of some 2,000 countries throughout the country, there are approximately 1,100 with small-scale hydropower resources amounting to over 10,000 kilowatts, and some have as much as 100,000-150,000 kilowatts. Small-scale hydropower stations are those whose single-generator capacity is below 6,000 kilowatts or less, and each station's capacity does not exceed 12,000 kilowatts. The policy of self-construction, self-management, and self-use is to be implemented for small-scale hydro projects. Self-construction means that capital funds should be raised through pooled efforts by local resources, communes/brigades, and peasants; appropriate supplementary aid can be provided by the state through long-term loans; after a hydroelectric station is completed, it sustains itself through the implementation of what we call "power supporting power." Self-management means that when hydroelectric stations are completed, they are not owned or managed by the state but by local communities, communes/brigades, and peasants involved in the projects. The small-scale stations are allowed to provide power to their own small supply zones; the transactions are handled by local accounting systems, which is economically profitable. Self-use means that small-scale hydropower should serve local communes, brigades, peasants, and small towns and cities, and it is not meant to serve large power grids; a local balance should be emphasized. Small-scale hydropower is aimed primarily at serving the local rural economy.

(4) Energetically build medium-scale hydropower plants. Besides emphasizing large-and small-scale hydropower, it is also important to put a certain amount of effort into medium hydropower stations, i.e., stations ranging from 12,000 to 150,000 kilowatts. As far as economic indices are concerned, some medium hydroelectric projects may not outstrip large ones; some of them may even be more expensive to build than the latter in terms of per kilowatt cost. But their advantages lie in the fact that they are relatively smaller in size, and can be built in a relatively shorter period of time with relatively faster turnover. Some of them can produce turnovers within 3 or 5 years. In power shortage areas with sufficient local enthusiasm and capacity for medium hydroelectric projects, we propose to have the state and local forces jointly invest in such projects. Recently, the Ministry of Water Resources and Electric Power and Zhejiang Province signed a joint venture agreement to build the Shangbiao Hydropower Station. It is a comprehensive utilization project with 16,000 kilowatts of installed capacity. Local funds account for two-thirds of the total investment, and the Central Government will fund one-third of the project. As we lack experience in this area, a great deal of study has to be done by all of us.

## 2. Strategic Measures for Accelerating Hydropower Construction

At present, there are a lot of problems which have to be solved in order to accelerate hydropower construction. From the strategic point of view, following are the major problems which need to be solved:

(1) With special emphasis on improving economic results, speed up hydropower construction by shortening the time limit of projects and cutting back building costs. At present, we should start from cutting back investments; the acceleration of hydropower construction is closely related to cost reduction. When the pace of construction is accelerated, the time limit is shortened, thus reducing costs. Conversely, the more energy we spend on a given project and the longer the deadline is, the more expensive the building cost becomes. Up to now, China has not fully implemented a credit loan system for capital construction, and there is no room for flexibility in accounting, i.e., it does not allow for interest payments or price increases. When the fund allocation system is replaced by the credit loan system, postponement of a project's deadline by 1 year not only incurs loss of a year's revenue, but also an additional year's interest payment. At present, low interest credit loans are available in China. To help accelerate capital construction and improve economic results, some people in the economic circles propose to increase state credit loan interest to 7 percent, which means that one would have to double the amount of investment in order to extend the time limit of a project by 10 years. Why have we been investing enormous sums of capital in hydropower construction projects with long deadlines and poor economic results over the past few years? Following are six possible reasons based on our analysis: First, we failed to strike overall balances in our plans. In the case of major projects, due to frequent changes of plans and insecure funding situation, the builders were forced to schedule their construction work according to objective practices in the construction business. For instance, a large-scale hydropower construction project needed 900 million yuan in capital funds, but only up to 30 million yuan of investments were planned for each year, which means that if 30 years were to be spent on the project, the funds would only be enough to cover the living expenses of the workers, and not the construction. Second, there was an unhealthy tendency within the Communist Party and society. Major state-sponsored projects tended to reach out everywhere, and extra demands were often made with regard to construction sites and migration of people. Although state regulations on land property had already come into effect, they were not seriously enforced in some regions. As recently pointed out by a leading comrade in the Central Committee, we can not allow the state to be taken advantage of like this anymore; there is an urgent need to put a stop to the unhealthy tendency by setting an example of one or two typical cases. Besides, we must also formulate policies that are advantageous to hydropower development, and allow us to provide economic benefits to local communities and civilians who contribute to the construction of hydropower stations. For example, in Sichuan, Yunnan, and Guangxi, such projects as Tianshengqiao, Lubuge, Pengshui and Longtan are all linked to Guizhou, i.e., some involve rivers on the border between these provinces and Guizhou, and some involve upstream portions in Guizhou, but the hydropower stations may be located in another province. As a result, the project will involve land inundation in Guizhou, and appropriate arrangements will have to be made by Guizhou for relocation of civilians. It is imperative to formulate suitable policies that will

allow us to solve such problems smoothly. For instance, after the power station is completed, the economic benefits should be shared in accordance with the contributions made by concerned provinces, including resettling the population and requisitioning land. The Ministry of Water Resources and Electric Power has adopted this measure and carried it out on trial basis in the Tianshengqiao project with fairly good results. The fact that the Tianshengqiao project enjoys good prospects now indicates the effectiveness of the policy. On the other hand, those who violate state laws and regulations and profit from it should be reprimanded and educated by their local governments; serious offenders involving construction losses should be tried in court and punished by law. Third, construction speed is also affected by problems arising out of failure to provide ensured material conditions, including failure to supply equipment and materials on time, or delays due to delivery of poor quality equipment which have to be sent back the constructors to be redone. Fourth, failure to meet project deadlines due to problems in surveying or designing. There have been instances where the selection of dam sites were based on poor geological surveys, and the geological problems were not discovered until after the construction work had begun, forcing relocation of dam sites. Increased volumes of work resulting from poor geological surveys were quite common. This was especially true of projects which had been implemented by executing the "three phases [designing, building and putting into production model] simultaneously;" the work volume increased drastically as the result of miscalculating the projected amount of work prior to the construction phase. Such problems are mainly caused by lack of long-range planning and failure to provide necessary estimates of projected time periods. Due to power shortages or other emergency situations, some proposed which had no blueprints to begin with were suddenly put on the drawing board and hastily completed without geological surveys or making necessary time period projections, thus causing quality problems in designing. This type of problem can only be solved through the formulation of long-range and medium-range plans by the state. Of course, there are other factors, such as backward designing methods, delays in supplying of construction chart paper, etc. which can affect construction work and should also be regarded seriously. Fifth, backward construction management, and "eating from the same big pot." Some hydropower construction teams are aging, i.e., both cadres and workers are getting old and physically weak, leaving few able-bodied persons for frontline work. Sixth, due to real price increases, building costs are also going up. Moreover, there may also be increases in construction-related charges, such as ownership tariff for fixed assets, i.e., a fixed asset ownership tariff will be levied on heavy hydropower equipment, etc; the low utilization rate of some heavy equipment also impacts on investment decisions.

(2) Stress restructuring, implement economic responsibility system. From the preceding analysis of the six factors, it can be seen that it is imperative to emphasize restructuring when solving such problems. The need for restructuring not only applies to the lower level, but also to the upper level. Moreover, the upper level has even graver problems

which call for overall and systematic restructuring. First, in order to improve our understanding of restructuring, it is important to regard restructuring problems in the light of guidelines. We should not only restructure erroneous things which had come into existence during the "great cultural revolution," but also certain things which had come into existence prior to the "great cultural revolution" but were not entirely correct, as well as those which were suitable then but are no longer suitable under present conditions. In sum, there is need to restructure the unsuitable parts of productive forces and production relations, the superstructure and economic foundation. Restructuring of our hydropower construction system should start from hydropower construction companies, i.e., they should be restructured into real enterprises that will gradually become independent economic accounting [units] capable of accounting for their own profits and losses. In the restructuring of construction bureaus, it is important to stress the contractual system and implement the economic responsibility system, i.e., contracting projects and assuming full responsibility for profits and losses, and combining "responsibility with power and interests." This is the only way to arouse the enthusiasm of the broad ranks of construction workers. The Min Jiang Construction Bureau implemented the system of contracting projects, such as the construction of Chitan Hydropower Station, expansion of Fuzhou Airport, and the construction of new airport in Xiamen. Some of these projects were completed ahead of time and others were finished on time. Originally scheduled to be completed in 1 year's time, the Xiamen Airport was actually completed in 9 months; approximately 10 percent of the capital investment was saved and the quality of construction was up to standard. The Bureau summed up the following three experiences: First, overall contractual obligations and guarantees, i.e., implementation of the "four contractual responsibilities" and "four guarantees." The "four contractual responsibilities" cover the work volume, project deadline, construction cost, and quality; the "four guarantees" include ensuring such conditions as providing capital investments, major materials and state supplied materials, blueprints, as well as securing cooperative support from other major ministries. Both parties are liable for the preceding contractual obligations and guarantees by force of the economic responsibility system, i.e., those who fail to carry out their contractual responsibilities will be fined. Penalties are enforced through the construction bureaus. On the other hand, if one party fails to provide guaranteed conditions, the other party will have the right to prolong the project deadline or increase the construction cost. Second, the first party should organize a group of ten-odd persons to monitor the quality, deadlines, construction costs, etc. of the project. Third, strengthen quota management; every project must have quotas. This forms the basis for contracts, and it is on this very basis that contracts are carried out. Otherwise the contracts will turn out to be a mess. The Min Jiang Engineering Bureau contracted the main hydropower company on a quota basis; grassroot units were subcontracted on the basis of the overall quota, i.e., the piece rate wage system was adopted wherever possible, otherwise the work volume was subcontracted among work districts and teams, thus implementing a fairly complete economic responsibility

system with different levels of subcontracting. These were the three experiences of Min Jiang Engineering Bureau. I would like to add another extremely important experience: the need for a good leading group. At present, there is neither a perfect legal system nor rational pricing system in our country, and there are quite a number of dishonest practices going on in our society. The reason some organizations had failed in the past to successfully implement the economic responsibility system was due to the lack of good leading groups; in some cases, the management made use of its contractual power to abuse the state, live on the state and cheat the state; in other cases, complete losses were incurred as the result of incompetent management. Practice has proven that the more power the bad leading groups have, the more harmful they are to the country. The only way to properly handle the relations between the state, the collective and the individual, the only way to really enable the state to get the lion's share, the enterprise get the middle share, and the individual get the small share, and the only way for the hydropower construction system to implement project contracting in a planned way is by having a sound leading group armed with proper guidelines and policies.

As to what form of economic responsibility system should be adopted by designing departments, that is a fairly complex problem. One idea is based on the fact that designing departments are mostly engaged in mental work, which makes it very difficult to come up with precise quotas, or to do accounting entirely on the basis of work volumes. Thus, it is recommended that designing departments should implement the funds contracting system, i.e., contractual operating expenses, remunerations and bonuses. On the basis of the three contractual funds, implement the floating wage system to arouse the enthusiasm of the staff and workers. It seems that the system of floating salary increases is relatively suitable for mental work departments and conducive to arousing the enthusiasm of designers and technicians. If one's floating salary is sustained for a period of 4 years, it becomes fixed. But one's floating salary will disappear if he leaves his organization; it will be reduced if one is not doing well at work or unable to complete his tasks. Another idea involves complete restructuring of designing institutes into enterprises which implement the contractual system both internally and externally. It is a major reform that will require efforts of all concerned. For example, the price rates for designing work should be checked and approved by the state; the state should have a fairly complete schedule of single-item prices and quotas; integral economic accounting systems should be set up inside the designing institutes. The bidding system can be employed in hydropower designing projects, i.e., whichever designing institute can provide better service at lower costs will be contracted for the project. Of course, this system will have to be proven through pilot projects and practice. I also believe that it is possible to enhance the independence of the machinery manufacturers of the hydropower construction enterprise by replacing the system of submitting profits to the state with taxation system.

(3) Accelerate hydropower construction by relying on the progress of science and technology. Through decades of construction, we have fostered a contingent of outstanding designers and constructors, and accumulated quite a wealth of experiences in hydropower construction. But over the past few decades, hydropower technology in other parts of the world has progressed very rapidly, and there are quite a number of things we have to learn. In the future, we must rely on the progress of science and technology to improve engineering quality and economic results. Here are some examples. The first concerns the Ertan hydropower project which requires building a dam 240 meters high. We have never built such high dams before, and we have only handled 160 meters. A group of foreign experts have suggested that by changing the arched dam to a double-arch dam, it is possible to save more than 1 million cubic meters of concrete. If feasible, it can greatly reduce building costs and greatly shorten the project time span as well. Another example is the tunnelling problem. There will be a great deal of tunnelling in hydropower projects in the southwestern part of China, e.g., tunnels will have to be built at Tianshengqiao, Lubuge, and Jinping, and a diversion tunnel will be constructed at Ertan as well.

What is the best way of tunnelling--with excavators or drilling and detonation methods? Or does the option depend on such conditions as time and place? World tunnelling techniques have developed very rapidly, e.g., multiple-arm drills, millisecond detonation, smooth-surface detonation, large full-face tunnelling machines, etc. We should study them carefully. Yet another example: As we are currently short of cement supply, it is very important to find means of further economizing cement, especially in large-scale dam projects where pulverized coal ashes are used for saving cement. Pulverized coal ashes are not only useful for saving cement, but also for reducing hydration heat, improving concrete quality, reducing engineering construction costs, etc. Our hydropower construction system consumes approximately 30 million tons of pulverized coal ashes. In the future, with the use of electric dust removers, pulverized coal ash resources will become even more suitable for building large-scale dams. The hydropower company should carefully study this problem, and draw up overall plans. Also involved are such problems as transportation and processing/grinding. To solve the transportation problem, the Machinery Manufacturing Company's Baoji Factory which mainly produces train chassis can be converted into a tank truck plant to produce vehicles for transporting cement and pulverized coal ashes.

In surveying and designing, our methods are relatively backward. Advanced techniques should be employed to accelerate surveying and designing, e.g., geophysical exploration, remote sensing, etc.

We should enhance international exchange of techniques and experiences in the realm of hydropower construction. In the past, construction organization employees had relatively little opportunity to go abroad.

In the future, efforts should be made in a planned way to provide construction personnel with all kinds of opportunities to visit hydropower construction sites in other countries; construction bureaus and grassroots-level organizations should select bureau chiefs, chief engineers and engineers who are truly outstanding, and allow them to broaden their minds and really digest, popularize and apply what they have learned from such visits. The advance of science and technology requires major efforts in the training of personnel. At present, our technical force in hydropower construction is relatively weak; technical employees only account for roughly 6 percent of the total number of personnel, which is lower than the average level of the entire hydropower system. To solve this problem, we should first of all rely on regular state-run universities and polytechnic schools to train university graduates and secondary level technical school students. Second, construction organizations should train their own people, and establish correspondence schools, sparetime universities and television-instruction universities. Young staff members and workers who hold promising future through proper training should be sent to the schools; other candidates can be chosen from among offsprings of our own staff and workers, as well as outstanding youths waiting to be assigned to job posts. We must train people in order to build up our technical contingent. Of course, as we organize our own universities and schools, emphasis should be placed on ensuring the quality of education and imposing strict requirements on school systems. Diplomas should be issued on successful completion of final examinations, and graduates should enjoy equal treatment in accordance with their academic qualifications. Such measures will help to arouse the enthusiasm of the students.

(4) Reinforce construction of leading groups. It is a critical issue which concerns speeding up of hydropower construction. The head hydro-power company has already done a lot of work in adjusting its leading groups; 17 out of 23 directly affiliated organizations have been adjusted, accounting for two-thirds of the total number. As the result of the adjustments, the contingent of cadres have moved one step closer to the Four Modernizations. But there is still a long way to go yet, as a great deal of adjustments have to be made in the remaining one-third directly affiliated organizations, especially in lower level organizations, such as branch bureaus, teams and workshops. There are also some major organizations which have not been adjusted yet. The head company is urged to step up adjustments. Leading groups which have already been adjusted still tend to be in the higher age bracket, and lack sufficient knowledge or professional qualifications. Some leading groups are transitional. In the future, frontline construction enterprises should pay especial attention to placing vigorous and professional middle-aged cadres in key management positions. Regulations on average age can be slightly relaxed for leading groups of designing academies, i.e., academy directors and secretary generals up to 60 years of age are acceptable; deputy directors and deputy secretaries should not exceed the age of 55. The average age of the leading group should be 50 or under. It is not

necessary to emphasize professional qualifications in the appointment of secretarial positions; such positions can be taken up by slightly older cadres or veteran-worker cadres whose main line of duty is to carry out political ideological work, have a good grasp of principles, and maintain good working relations between leading cadres and broad ranks of intellectuals. Adjustments should also be carried out in department level management. Specialized departments should be managed by professionals. It is best to choose a person with professional qualifications to be Party branch secretary of a department as it will be very difficult to establish a common language between the Party branch secretary and engineering and technical cadres if the former has no disciplinary knowledge at all. In grassroots level hydropower construction organizations such as branch bureaus, departments, work districts and teams, it may be difficult under present conditions to appoint engineering and technical cadres of intellectual background to all management positions in the forefront of production; thus, it is better to have both veteran-worker cadres and intellectual background cadres in leading groups. In the future, we should select candidates from among younger and better educated workers, and train them to be group leaders and grassroots leading cadres. In the future, some of them will be promoted to such positions as branch bureau chiefs, work district supervisors, and team leaders. Not only will they be able to take personal charge of work, they will also become educated cadres with a certain amount of knowledge in management and technology. They will form a contingent of our new type of cadres.

(5) Build sound rear base for hydropower construction. This is a strategic measure aimed at speeding up hydropower construction. Here are a couple of ideas for building the base: First, the base is a living area; in principle, staff and workers should go to the front-lines, leave behind their families in the rear, and take turns going home on vacation leaves. Second, adhere to the principle of combining life and production, i.e., the rear base serves as both a life base and production base where some of the processing jobs are performed for the hydropower construction effort; construction unit plants will be gradually built, and the processed units will be delivered to the frontlines. Service companies can also be organized; workers who are unsuitable for frontline work, including those who are in poor health and have not reached the retirement age, or those who have retired but are still in good shape, can undertake some social service work. The service companies should be independent accounting units, and assume full responsibility for their own profits and losses. Third, the life base is also an educational base for organizing all kinds of educational and other kinds of enterprises. This will enable us to organize unemployed sons and daughters and have them trained as reserve work forces; but we are not responsible for assigning them to job posts, and there will be no eating from the "same big pot," i.e., employment of individuals is to be based on each person's qualifications. We should also organize correspondence courses and television instruction universities to train medium level and advanced level technical personnel.

Fourth, the bases should have suitable sites and layouts, i.e., they should be suited not far from construction sites and future work sites for the convenience of both production and daily life, and also taking into account future shifts in construction tasks. Fifth, the ministry and head company should support the construction of the bases through various resources, e.g., funds for small-scale capital construction, fund raising efforts and funds for use prior to construction of work sites. Money saved from construction site investments, as well as leftovers from enterprise bonus funds and contract funds can be used for supporting base construction. Sixth, promptly summarize and exchange experiences, and train people to manage rear bases. The bases must be managed by economic means, and not eating from the "same big pot." The bases must be turned into real strategic rear areas for hydropower construction, combining life, production and education. This way, we can provide the hydropower construction contingent with means of supporting its senior members and educating its youths; moreover, people working in the frontlines need not worry about the rear, thus providing the contingent with security, and arousing the enthusiasm of the broad ranks of staff and workers.

Those are some of my ideas on hydropower development guidelines and accelerating hydropower construction, which may or may not be correct--I am merely offering a few commonplace remarks by way of introduction so that you may come up with valuable ideas and suggestions. I believe that once we have determined guidelines for developing hydropower and come up with strategic measures, we will then be in a position to create excellent conditions for vigorously developing hydropower. I hope that the broad ranks of staff and workers in the hydropower construction front will work energetically in a concerted effort to make new contributions towards accelerating hydropower construction and opening up new prospects for power construction.

9119  
CSO: 4013/289

## HYDROPOWER

### EXPLOITATION OF QINGHAI'S HYDRAULIC RESOURCES HOLDS TREMENDOUS POTENTIAL

Beijing RENMIN RIBAO in Chinese 6 Oct 83 p 5

[Text] Originating at the northern foot of the Bayan Har Mountains on the Qinghai Plateau, the Huang He enters a gorge below Maqu, where it drops abruptly in a raging torrent. The hydraulic reserves of the upper course of the Huang He and its tributaries within the borders of Qinghai are tremendous.

After more than 20 years of prospecting, hydropower scientific workers have determined that there are some 108 tributaries in Qinghai capable of generating in excess of 10,000 kilowatts with a total hydraulic reserve of approximately 21.65 million kilowatts; 172 medium- and large-scale hydropower stations could be built with a total installed capacity of 17.98 million kilowatts. On the mainstream of the portion of the Huang He within the borders of Qinghai alone hydraulic reserves could surpass 13.63 million kilowatts--more than one-third of the total hydropower reserves of that river. If all of this reserve could be harnessed and put to use, it would equal 11 Liujiashia hydroelectric power stations. In March of this year [1983], S&T workers of the Northwest Survey and Design Institute of the Ministry of Water Resources and Electric Power completed a comprehensive study that demonstrated that on the 276-kilometer section of the river from Longyangxia to the point where it exits the province, six large-scale, cascade stations with a multiple-year regulatory function could be built. Total installed capacity could exceed 8 million kilowatts which could translate into 30 billion kilowatt-hours a year after the project has been completed. From its point of origin to where it leaves the province, the Huang He drops more than 4000 meters. The volume of flow is stable and the volume of silt small. Conditions for building hydroelectric power stations are superb.

The comprehensive economic benefits from building large-scale hydropower station on the upper course of the Huang He are tremendous. First, the loss to flooding in the reservoir areas would be small and, except for the flooding and displacement of population caused by the big reservoir at Longyangxia, a major water conservancy project, flooding and population displacement caused by the other cascade hydropower stations will be negligible, the smallest of any similar project in the nation. Second, after this stretch of the river has been developed, it will not create any shipping or transportation problems. On the contrary, it will provide electricity,

irrigation, flood control, and many other economic benefits. Its electric power, in addition to meeting the needs of industrial and agricultural production in Qinghai Province, can also be transmitted to North China, Central China, the southwest, and other neighboring large power grids. After the reservoirs have been built, the stored-up water released by the cascade dams during the low-water season can supply irrigated regions in Ningxia and Nei Monggol with some 2 billion cubic meters of water. During the flood season, the reservoirs would control the flood crests, enhancing flood control at Liujiaxia and other big hydropower stations and Lanzhou City downstream in Gansu and play a key role in controlling ice during winter and spring in Ningxia and Nei Monggol.

The development of the hydraulic resources of the upper course of the Huang He will promote the growth of enterprises in Qinghai Province; a 200,000-ton-a-year electrolytic aluminum smelter is already taking shape and an aluminum products plant is now under construction. In addition, work will soon get under way on a 4000-ton-a-year magnesium enterprise.

CSO: 4013/13

## HYDROPOWER

LUBUGE TO GO ON STREAM IN 1989--WILL BE YUNNAN'S LARGEST HYDROPOWER STATION

Kunming YUNNAN RIBAO in Chinese 29 Aug 83 p 2

[Article: "Yunnan's Largest Hydropower Station Now Under Construction"]

[Excerpts] The Lubuge Hydroelectric Power Station, now in an intensified construction preparation phase, is one of the nation's 93 key projects and also the biggest hydropower station being built in Yunnan Province. Plans call for this hydropower station to go on stream in 1989; work on the main part of the project will formally get underway next year [1984].

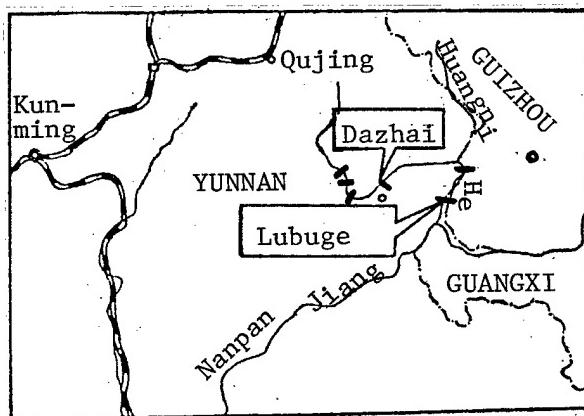
The Lubuge Hydroelectric Power Station is located on the border between Loping County in Yunnan Province and Xingyi County in Guizhou Province. On the 10-kilometer-long stretch of river to be developed, the banks are precipitous and the water flows in a torrent. The power station will make use of the natural drop of the river with a high dam with long penstocks. The designed head is to be 315 meters and four generators with a total installed capacity of 600,000 kilowatts are to be installed which will generate 2.9 billion kilowatt-hours of electricity a year. The installed capacity of this hydropower station represents 50 percent of the current installed capacity of the province and after it is completed the power output capacity of the province will be increased by more than 40 percent. In addition to supplying electricity to Kunming and Qujing, a portion of the power may be transmitted to other cities and towns. It will supplement and regulate the seasonal Li He and Xi'er He hydropower stations within the provincial system, to better guarantee the system's power output. As a result, within a span of 10 years, it will be a backbone station that will satisfy the entire province's peak load requirements.

The main project of the Lubuge Hydroelectric Power Station is divided into the initial key project, the water diversion system, and the plant building complex. In the initial key project, a 101-meter-high dam will be constructed; 216 meters long on its crest, the dam will be 520 meters thick at the base. It is a clay corewall, rock-fill dam. In order to discharge floodwaters and control silting in the reservoir, the initial stage key project includes spillways, flood discharge tunnels, silt drains, and diversion tunnels. Downstream from the dam site, plans call for the excavation of a power tunnel with a length of over 9 kilometers and an inside diameter of 8 meters, a differential surge shaft, steel pipes, and a structural water diversion system. The core

of the building area will include the main and secondary buildings, a tailrace tunnel, and outlet tunnels. In addition to the main dam of the hydropower station, there is a vast amount of difficult excavation to be done underground and in sheer rock faces. The power tunnel and other projects will be undertaken with loans from the World Bank with contract bids coming from domestic sources as well as foreign concerns--it is the first time foreign funds have been used to build a hydroelectric project in the country.

Construction teams arrived on the site of the hydropower station in 1976, and the intensified phase of construction on the main portion of the project has already begun, following stepped-up preparatory work undertaken in the last 2 years. For the past several years, cadres and workers of the 14th Construction Bureau of the Ministry of Water Resources and Electric Power, the unit responsible for building the hydropower station, have, with assistance from the party and government of Yunnan and Guizhou provinces as well as local people's organizations, overcome all sorts of problems in putting in roads, water, and electricity, blasting roads through mountains, leveling hilltops to construct buildings, spanning gorges with bridges, and digging tunnels in precipices.

So far, workers have constructed more than 140,000 square meters of building space and have put in some 120 kilometers of roads and erected two bridges to connect the Yunnan and Guizhou sides [of the river]. The No 4 and No 5 auxiliary tunnels and a portion of the main power tunnel have been completed ahead of schedule with more than 2,200 meters excavated in all. Today, some 7,000 hydropower construction personnel are hard at work on both sides of the gorge, determined to begin overall construction at an early date.



CSO: 4013/9

## HYDROPOWER

### FULL-SCALE CONSTRUCTION BEGUN ON LONGYANGXIA

Taiyuan SHANXI RIBAO in Chinese 24 Jul 83 p 3

[Article: "Full-scale Construction of Longyangxia Hydropower Station To Exploit Huang He's Hydropower Resources, Expedite Development of the Northwest Region"]

[Text] The project to build the Longyangxia hydropower station has entered the stage of full-scale construction centering around the pouring of the main dam.

Longyangxia is located in Hainan Zhangzu Autonomous Prefecture, Qinghai Province, some 140 kilometers from Xining. Here, the Huang He heads east along a gorge several tens of kilometers long. With steep cliffs on both banks, the riverbed is narrow and the flow is rapid. These are favorable conditions for hydropower stations. The section of Huang He from Longyangxia to Qingtongxia in Ningxia is more than 900 kilometers long with a natural drop of 1,324 meters. It is called a "rich mine" of hydropower resources. According to the state's preliminary plan, 15 cascades can be developed in this section.

The Longyangxia Hydropower Station is the first cascade hydropower station on the upper reaches of Huang He. The dam's designed height is 177 meters, the highest in China. After its completion, the largest artificial lake in the country will be created covering an area of 393 square kilometers with a capacity of 26.8 billion cubic meters. The installed capacity of the power station is 1.28 million kw with an average annual generation of 6 billion kwh.

This is a large hydropower station suitable for comprehensive utilization and water regulation over multiple-year periods. After completion, it will play a great role in exploiting the hydropower resources of the Huang He and in expediting the development of the northwest. First, it will supply more power to the Shaanxi-Gansu-Qinghai grid, and, through regulation of the water flow, will enable the four hydropower stations of Liujiasha, Yanguoxia, Bapanxia, and Qingtongxia to increase their annual power output by 640 million kwh. Second, joint operation of this power station with Liujiasha Hydropower Station will bring about a net increase in irrigated acreage of 14,910 mu in the valleys on the lower reaches of Huang He, a net increase in the replenishment of water for irrigation of 6.5 billion cubic meters, and a net increase in the supply of industrial water of 470 million cubic meters. Finally, it will be advantageous to the development of cascades below Longyangxia, and to the prevention of flood and floes in Lanzhou, Ningxia, and Nei Monggol.

9411  
CSO: 4013/315

## HYDROPOWER

### HEBEI BUILDS 690 SMALL-SCALE HYDROPOWER STATIONS

Shijiazhuang HEBEI RIBAO in Chinese 13 Jul

[Article by Xin Dexiang: "Hebei Has Already Built More Than 690 Small-Scale Hydropower Stations; Vigorous Development of Small-Scale Hydropower Stations Is Advancing Agricultural and Subsidiary Industrial Production in Mountain Regions"]

[Excerpt] This reporter has learned the following from the Provincial Water Conservancy Department: According to statistics, from January until the end of June of this year the accumulative total output of power produced by small-scale stations has now reached 65.8 million kilowatt-hours, a 2.7-fold increase compared with the same period last year. This has provided strong support for agricultural and subsidiary industrial production by commune production brigades in mountain regions. The power resources of our province available to small-scale station exploitation totals about 500,000 kilowatts--18 percent of which has now begun to be utilized. Up to the end of last year, 693 small-scale hydropower stations had been built and put into production. Total installed capacity is more than 93,000 kilowatts, and, on an annual basis, these could produce about 100,000,000 kilowatt-hours. There are 40 stations above 500 kilowatt capacity, and 65 stations that are incorporated into the national and local power grids with a total capacity of 69,000 kilowatts. At present, in the entire province there are 1,129 production brigades of 168 communes in 43 counties that have begun to set up power stations. Among these, development has been fastest in Pingshan County. This county now has 141 small-scale hydropower stations with an installed capacity of 7,920 kilowatts, which allow the 198 production brigades of the 25 communes in remote mountain regions of the west which are not easily reached by the national power grid to have electricity. The speedy development of small-scale hydropower has accelerated the development of agricultural and subsidiary industrial production. After Sandaohe Commune in Xinglong County set up a small-scale power station, it started 28 subsidiary industries, assigned production locations, and the average annual income of all commune members increased by 50 yuan. Such production brigades as Donghao Brigade in Qinglong County are relying on small-scale hydropower to become rich. The peak power production by small-scale stations has coincided with an increased use of electric power by agriculture. This has greatly alleviated the power shortfall situation for villages in mountain regions.

Hebei is now building 30 more small-scale hydropower stations with 47 generators and a total installed capacity of more than 13,000 kilowatts.

9648  
CSO: 4013/294

## HYDROPOWER

### STATE COUNCIL APPROVAL OF PROPOSALS FOR HUGE SHUIKOU HYDROPOWER PROJECT

Fuzhou FUJIAN RIBAO in Chinese 7 Sep 83 p 1

[Text] Plan proposals for the Shuikou Hydroelectric Power Station, slated for construction under the Sixth Five-Year Plan, were recently submitted to the State Council by the State Planning Commission for official approval. The construction of this hydropower station, with an installed capacity of 1,400 megawatts, is the direct responsibility of the Ministry of Water Resources and Electric Power.

In order to complete the preparatory work for the initial construction stage of this large-scale, broad-scope hydroelectric power station, the State Planning Commission recently issued a notice calling on all involved departments and Fujian Province to determine, according to the relevant State regulations, an economic responsibility system and divisions of labor with individual responsibilities. The notice made clear delineations: The Ministry of Water Resources and Electric Power will be responsible for surveys and designs, the quality of construction and progress of the work, overall project budget estimates, and the economic results; the Fujian Provincial People's Government will be responsible for planning and making budget estimates for the flooding of the reservoir area and the relocation of the populace, coordinating these efforts with the aforementioned ministry; working out the plans and budget estimates to relocate the railroad within the reservoir area and the construction work involved will be the responsibility of the Ministry of Railways; preliminary designs for the Shuikou Hydroelectric Power Station, plans to flood the reservoir area and to relocate its residents, plans to relocate the railroad, models and designs for dams to accommodate shipping and log rafts, overall project budget estimates, etc., must be submitted to the State Planning Commission for review and approval. No construction personnel will be dispatched until the proposed item has been placed officially on the agenda.

The notice calls upon the Ministry of Water Resources and Electric Power, the Ministry of Railways, the Ministry of Communications, the Ministry of Posts and Telecommunications, the Ministry of Forestry, and the Fujian Provincial People's Government to make careful examinations and strict budgetary studies. Initial phase work on the power station will be undertaken with a view to conserving funds, reducing the construction time, and pooling experience and resources with priority given to project quality and safety.

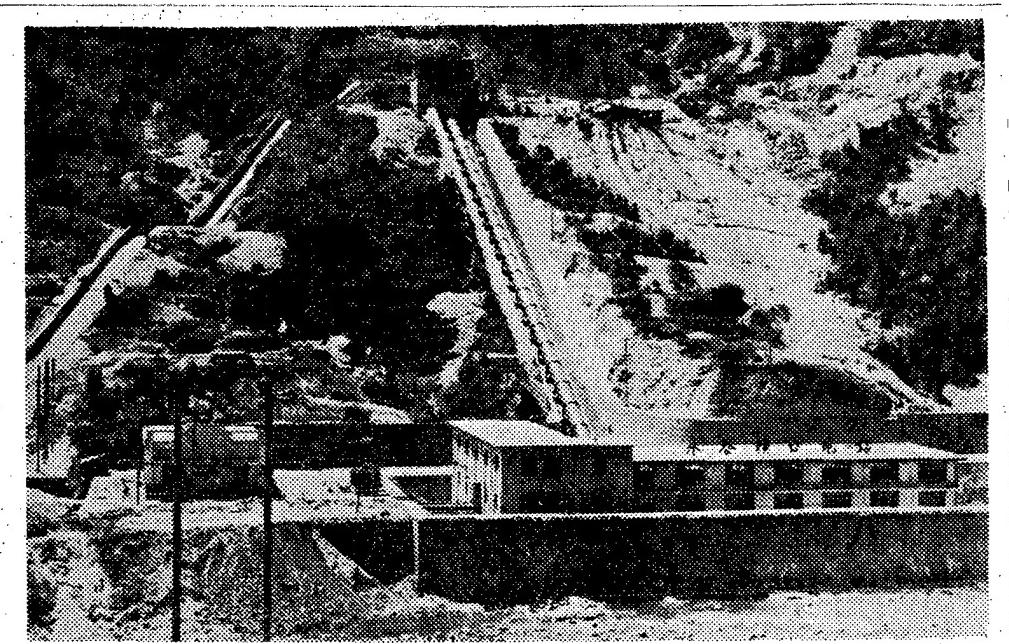
## HYDROPOWER

SMALL-SCALE HYDROPOWER BRINGS GOAL OF RURAL ELECTRIFICATION ONE STEP NEARER

Fuzhou FUJIAN RIBAO in Chinese 30 Sep 83 p 1

[Article: "Hengkou Hydropower Station Goes on Stream 6 Months Early"]

[Summary] The first stage of the Hengkou Hydropower Station in Yongchun County, which calls for the installation of two generators, went on stream on 29 September. This county-operated station has a designed installed capacity of 4,800 kilowatts, two generators with a rated capacity of 3,200 kilowatts being installed in the first stage. With these two generators now in operation, the total small-scale installed capacity for the county has grown to more than 26,800 kilowatts. This translates into 64 watts in installed capacity (or 183 kilowatt-hours per year) for each resident of the county. More than 18 million kilowatt-hours can now be generated a year, bringing in revenues of something over 500,000 yuan. Now, two-thirds of the electricity needed by the Tianhushan coal mine can be guaranteed and more than 10,000 tons of coal used in thermal power plants can be saved. Not only will local gaps in power service be filled, it will be much easier to further develop upstream power stations. County industrial and agricultural output will be enhanced, electricity will be substituted for firewood, and mountain forests will be preserved.



The Hengkou Hydropower Station, Yongchun County, Fujian Province.

CSO: 4013/18

## HYDROPOWER

### BRIEFS

TONGJIEZI UPDATE--Work on the main portion of the Tongjiezi Hydroelectric Power Station in Sichuan--one of the key national construction projects--was begun recently. This hydroelectric power station is a large-scale key water conservancy project with an installed capacity of 600,000 kilowatts capable of generating 3.2 billion kilowatt-hours of electricity a year. When it has been completed, it will operate in concert with the already-built Gongzui power station upstream on the Dadu He in a regulatory role and boost the latter's power output capacity by 60,000,000 kilowatt-hours a year. It is on the list of 93 major construction projects nationwide. The staff and workers of the Seventh Engineering Bureau of the Ministry of Water Resources and Electric Power responsible for the construction of this hydro-power station, following the completion of the Gongzui hydropower station, shifted their attack here, and, after 3 years' preparatory work, have this year entered the overall construction preparation stage. Recently, as part of the power station's main project, work began on roads to support construction of the lower foundation excavation on the right bank and the log gate and on the dam-top roads on the left and right banks and the flood prevention embankments. [Excerpt] [Chengdu SICHUAN RIBAO in Chinese 18 Aug 83 p 1]

HONGSHI POWER STATION UPDATE--The Hongshi Hydroelectric Power Station project in Jilin Province, begun on 1 September 1982, successfully blocked the flow [of the river] at 2:21 pm on 25 September [1983]. This is the shortest time on record for the construction of a medium-sized hydroelectric project in China. The Hongshi hydropower station is the third in a series of cascade stations on the Di'er Songhua Jiang's upper reaches. Located below the Baishan Hydroelectric Power Station, Hongshi's designed installed capacity is 200,000 kilowatts. [Text] [Beijing RENMIN RIBAO in Chinese 29 Sep 83 p 1]

TAIPINGWAN HYDROPOWER STATION UPDATE--The cofferdam of the Taipingwan Hydropower Station on the Yalu Jiang--a project jointly funded by China and Korea--was completed on 6 October. The project started last October. A ceremony was held to mark the completion of the cofferdam. Attending the ceremony were Yi Chong-song, Korean director of the China-Korea Yalu Jiang Hydropower Company and vice minister of the Korean Ministry of Power Industry; Li Daigeng, Chinese director of the China-Korean Yalu Jiang Hydropower Company and vice minister of water resources and electric power; Liu Shutian, secretary of the party committee of the State Hydropower Construction Bureau; and Peng Xiangsong, deputy governor of Liaoning. [Summary] [Shenyang Liaoning Provincial Service in Mandarin 1100 GMT 6 Oct 83 SK]

## THERMAL POWER

### FULARJI NO 2 POWER PLANT UNDER CONSTRUCTION

Shenyang LIAONING RIBAO in Chinese 30 Jun 83 p 4

Xinhua Dispatch: "The Fularji No 2 Power Plant--Power Center of the North-east Border Region"

Text Harbin, 28 June, NCNA--On the banks of the Nun Jiang on the western plain of Heilongjiang, a new power center has appeared. This is the Fularji No 2 Power Plant--the largest thermal power plant in the Northeast border region--now under construction.

At the site of this power plant, listed as a national key construction project, more than 8,000 workers are engaged in a crash construction project. Today, a 17-story main plant building is going up. Long rows of coal conveyors soar into the sky, and rows of pylons lead from the plant into the distance. More than 100 engineering projects for the dozen or so support facilities, including the pumping station, the chemical water treatment plant, and the transformer station have all been completed. Schools, shops, and employee housing have been built around the production site. A modern large-scale power plant is taking shape. It is estimated that the entire power plant will be completed by the end of 1984.

The Fularji No 2 Power Plant is situated some 30 km southwest of the city of Qiqihar--an important northern steel and engineering industry city. Some 100 km southeast of Qiqihar is the Daqing Oilfield. The value of industrial output in this region accounts for almost half of the value of industrial output of Heilongjiang Province, and requires a large amount of electricity. In the past, due to lack of electricity for long periods of time, some 600 factory enterprises in Qiqihar were forced to halt production 3 months out of the year. Due to a lack of electricity, crude-oil production of the Daqing Oilfield was also affected. Due to insufficient electricity, the growth of production of the major commodity grain production region--the millions of mu of fertile farmland on the Nun Jiang plain--is likewise affected. After its completion, the Fularji No 2 Power Plant, together with the Fularji Heat and Power Plant built during the First 5-Year Plan, will form an important power center for the western Heilongjiang grid. Each year, they will increase the power-generating capacity by 3.6 billion kWh, which will greatly ease the acute power shortage here. If every kilowatt-hour of electricity produces an output value of 2.7 yuan, then this output value will be increased by 9.7 billion yuan in 1 year.

9335  
CSO: 4013/284

## THERMAL POWER

### THIRD STAGE OF XINGTAI POWER PLANT EXPANSION UNDER WAY

Shijiazhuang HEBEI RIBAO in Chinese 3 Jul 83 p 1

Article: "Third Stage of the Xingtai Power Plant Expansion Project Gets Under Way"

TexE On 1 July, following approval by the Ministry of Water Resources and Electric Power, ground was broken on the two 200,000 kW generator third-stage expansion project for the Xingtai Power Plant.

The third stage of the Xingtai Power Plant expansion project is a joint investment project of the Ministry of Water Resources and Electric Power and Hebei Province. The amount of investment is 250 million yuan. It is a key construction project for the Ministry of Water Resources and Electric Power and Hebei Province in 1983. Both 200,000 kW generators of the third-stage expansion project are Chinese-made. Among the major facilities, the boiler will be produced by the Harbin Boiler Factory, the steam turbine and generator will be produced by the Sichuan Dongfang Steam Turbine Factory and the Sichuan Dongfang Electrical Machinery Plant, while the support facilities will all be produced domestically. This stage of the expansion project has been designed by the provincial Electrical Power Design Institute and the North China Electrical Power Design Institute. The provincial Electrical Power Construction Co, the Handan City No 1 Construction Co and the Xingtai City No 2 Construction Co will shoulder the task of this stage of the expansion project. These two 200,000 kW generators are slated to hook up with the main network to generate electricity by the end of 1985 and 1986 successively. After they begin to generate power, the Ministry of Water Resources and Electric Power and Hebei Province will distribute the electricity in accordance with the proportion of investment. The first and second stages of the Xingtai Power Plant project included three sets of generators with a total capacity of 90,000 kW. After the third stage of the expansion project is completed, the plant will become the second largest thermal power plant in the central-south region of Hebei, and will definitely play an important role in the growth of the national economy in our province and Xingtai Prefecture.

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## THERMAL POWER

### SHIHENG POWER PLANT TO PLAY KEY ROLE IN FUTURE SHANDONG ENERGY BASE

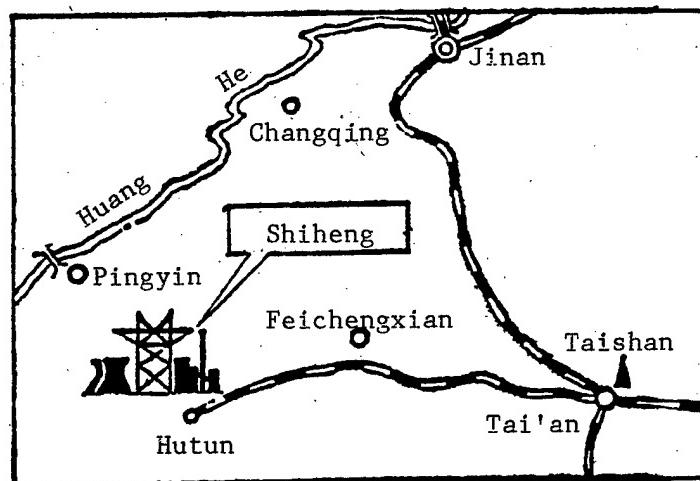
Beijing RENMIN RIBAO in Chinese 30 Sep 83 p 2

[Text] Another modern, large-scale pit-mouth power plant--the Feicheng Shiheng Electric Power Plant--is now under construction in the Feicheng coal fields to the west of Taishan in Shandong Province.

The Shiheng power plant is one of the state's key construction projects. Design specifications call for the installation of 1.2 million kilowatts in capacity. In the first phase of construction, two 300,000-kilowatt generating units will be installed, which, when completed, will generate 4.2 billion kilowatt-hours of electricity a year, playing a significant role in easing the strained power situation in Shandong.

Geographically, the Shiheng power plant is ideally situated: the Tai'an-Hutun Railroad passes nearby and there is abundant underground water.

The engineering design technology and the manufacturing technology for the main machinery for the 300,000-kilowatt generators and most of the auxiliary equipment are imported. The main machinery is being manufactured by the Shanghai Boiler Works, the Shanghai Steam Turbine Plant, and the Shanghai Electrical Equipment Plant. Computerized supervision and control will be used for all of the plant's operations; the degree of automation is high and energy consumption is low. It is a power plant equal to international advanced standards of the 1970's.



Location of the Shiheng Power Plant.

Today, work has begun on 25,000 square meters of auxiliary facilities for living and production at the plant. Work on the foundations of the main plant buildings goes on day and night.

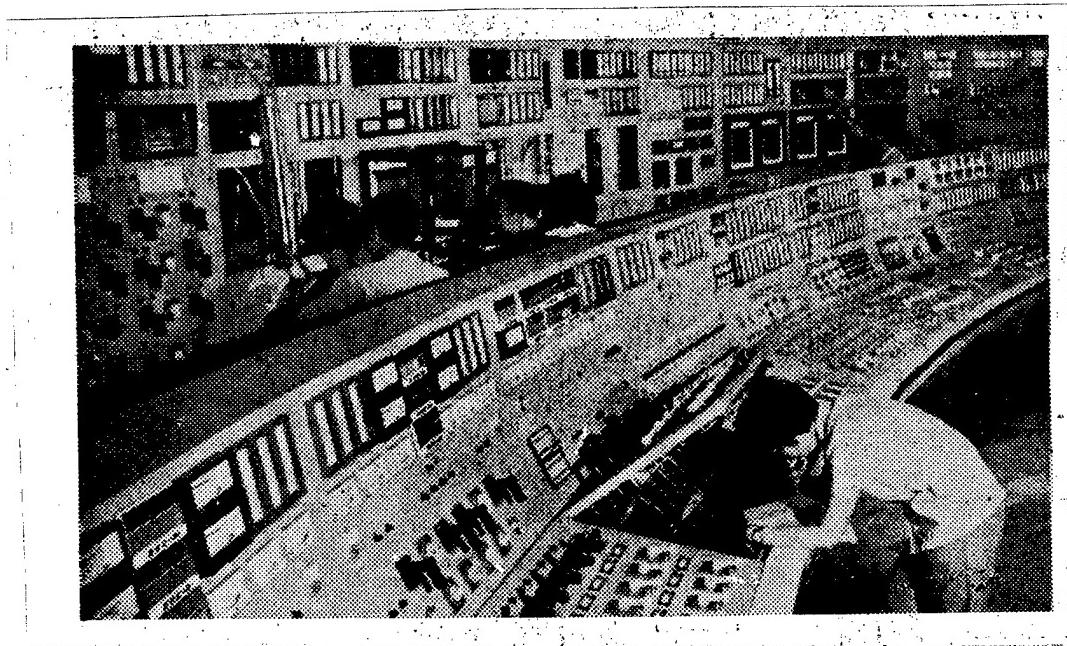
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THERMAL POWER

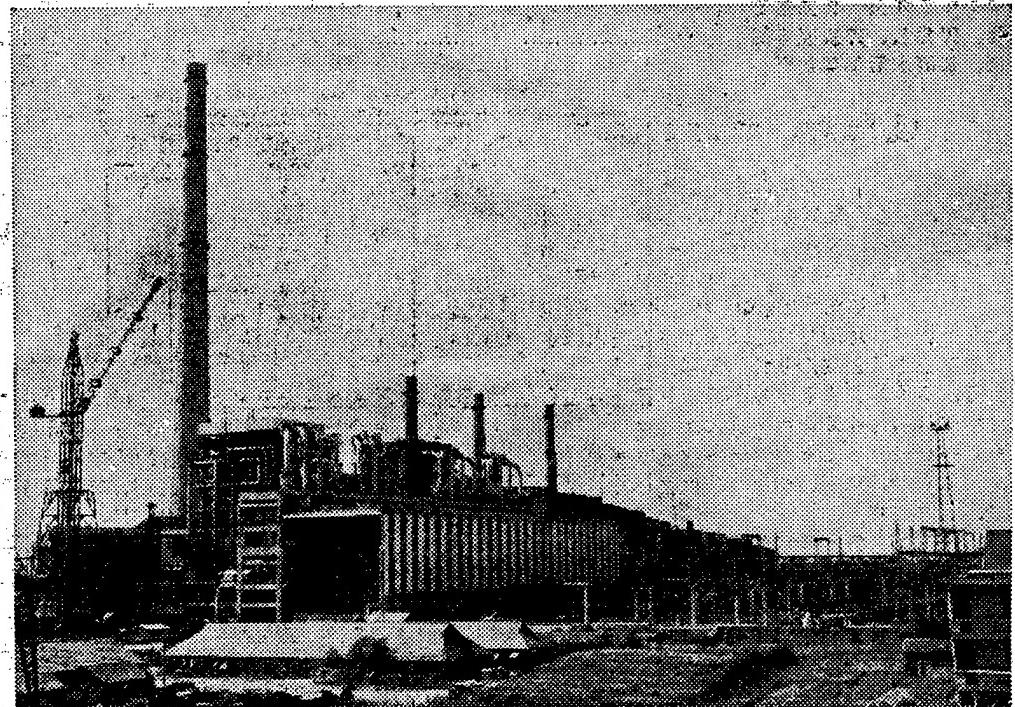
JIANBI WILL BE NATION'S LARGEST THERMAL POWER PLANT WHEN COMPLETED

Nanjing XINHUA RIBAO in Chinese 14 Aug 83 p 1

[Text] On the southern bank of the Chang Jiang, work is progressing apace on the fourth and fifth stages of the project to expand the Jianbi Power Plant. Under the two-stage project, four 300,000-kilowatt generators will be installed along with their auxiliary equipment. The entire project is slated for completion in 1987. After the project has been finished, the power plant's installed capacity will be more than 1.62 million kilowatts, making it the largest thermal power complex in the nation.



Equipment being installed and tested in the centralized control room of the second 300-megawatt generator of the fourth-stage expansion project, Jianbi Power Plant.



Exterior view of the Jianbi Power Plant, now undergoing expansion.

CSO: 4013/2

## THERMAL POWER

### WORK FORGES AHEAD ON JIANGSU'S XUZHOU, JIANBI THERMAL POWER PLANTS

#### Third Stage of Xuzhou in Full Swing

Nanjing XINHUA RIBAO in Chinese 17 Aug 83 p 2

[Excerpts] The project to build the four 200,000-kilowatt generator power plant at Xuzhou is in full swing. According to state requirements, generators No 5 and No 6 of these four generating units will be in operation in 1985 and the No 7 and No 8 generating units will be on stream in 1986 and 1987 respectively. After the completion of the third stage, the total installed capacity of the Xuzhou Power Plant will be 1.3 million kilowatts, creating another modern, large-scale power base in Jiangsu Province and playing a significant role in supporting industrial and agricultural production and in meeting the needs of the people.

The Xuzhou Power Plant is a pit-mouth power plant which mainly makes use of the coal resources in the Xuzhou region to generate its power. Work on this plant was begun officially in May 1976 and after 3 years and 7 months the first and second stages were finished, putting into operation four 125,000-kilowatt generators.

Work on the third stage of the Xuzhou Power Plant officially got under way in April 1982. Construction workers combined the experience gained in building the first and second stages and signed contracts with the Power Ministry, determined to work harder to complete the new construction tasks. Today, the greater portion of the foundation work for the four 200,000-kilowatt generators has been finished and the main equipment for the No 5 generator has been delivered.

#### Jianbi Readies Second 300MW Unit

Nanjing XINHUA RIBAO in Chinese 17 Aug 83 p 2

[Excerpts] On the south bank of the Chang Jiang, in the eastern outskirts of Zhenjiang, the second 300MW generator of the fourth stage of the Jianbi Power Plant is about to go into operation. After the powerful current enters the

East China Grid, it will provide new power for the cities, villages, and newly built industrial zones along the river. Concurrently, the power plant has begun the construction preparation work for the fifth stage of the project. This stage entails the installation of the No 3 and No 4 300 MW generators. With the completion of the fifth-stage project, the Jianbi Power Plant will have an installed capacity of 1.625 million kilowatts; this will have a major impact on easing the power supply situation in East China and play an important role in promoting the economy of the region.

The fourth and fifth stage expansion project of the Jianbi Power Plant is one of the nation's 93 key projects, calling for an investment of more than 500,000,000 yuan. While the second 300,000-kilowatt generator is being installed, personnel who will be "debugging" the equipment and later running it will undergo technical training in an all-out effort to generate power in September.

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## THERMAL POWER

### TONGLIAO POWER PLANT WILL BE 'HEART' OF HUOLINHE ENERGY BASE

Taiyuan SHANXI RIBAO in Chinese 24 Jul 83 p 3

[Article: "Construction of Tongliao Power Generation Plant Begins"]

[Text] A glittering pearl--the Tongliao power generation plant--will be set in the vast grasslands of Horqin, Nei Monggol.

This power plant is located on the west bank of the Liaohe River only 11 kilometers from the city of Tongliao in Jirem League. The Tongliao-Huolinhe Railway, approximately 400 kilometers long running across the northwestern portion of the Horqin grasslands, now links this power plant with the Huolinhe Opencut Coal Mine.

Construction of Tongliao Power Plant began in 1978. Its total installed capacity is 800,000 kW, and the construction is to be undertaken in two stages. During the first stage, two 200,000 kW units will be installed. According to plan, they will be fully operational by 1986 within the Northeast Power Grid.

Tongliao Power Plant and the Huolinhe strip mines are being built together. Most of the raw coal mined in the initial phase of operations of Huolinhe will be supplied to Tongliao Power Plant. The supply of power from the Northeast Power Grid cannot meet the future demand of the large number of modern power machines at the Huolinhe strip mines and must be supplemented by electricity from Tongliao Power Plant. To supply sufficient coal and electricity to the "starving" heavy industry in the northeast by the end of the century, the Horqin grasslands will become a large coal and electricity base. Huolinhe Opencut Coal Mine will be the body of this base and Tongliao Power Plant will be the "heart."

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## THERMAL POWER

### COMPLETION OF FIRST STAGE OF JINZHOU POWER PLANT SET FOR 1985

Beijing RENMIN RIBAO in Chinese 13 Jul 83 p 2

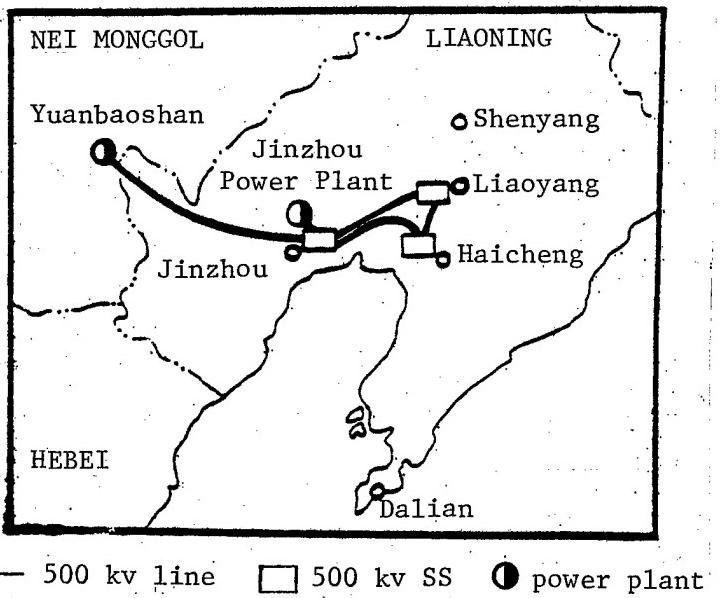
[Article: "Liaoning's Large-Scale Thermal Power Plant--the Jinzhou Power Plant"]

[Text] The Jinzhou power plant, a large-scale thermal power plant now under construction in western Liaoning, has already begun to take shape after 4 years of construction. The No 1 generating unit formally went into operation in January of this year; the No 2 generating unit will join the power grid and generate electricity at the end of the year.

The Jinzhou power plant is one of the nation's key projects. According to the requirements of its design, its total installed capacity will be 1.2 million kwh, i.e., a total of six generating units of 200,000 kwh each. The entire project will be carried out in two phases, each of which will have an installed capacity of 600,000 kwh. The first phase of the project formally began in June 1979; completion is estimated to be in 1985. The No 1 generating unit has run well ever since going into operation, and the construction of the other two generating units is being accelerated. The design for the second phase has already begun.

Liaoning is one of China's key industrial bases, but it is also one of the nation's most energy-consuming provinces, hence energy is in relatively short supply here. The whole province is short about 20 percent in electric power a year. This is equivalent to a generating unit of 1.5 million kwh. Based on calculations of the average output value created by each kwh of electricity in Liaoning last year, the province lost about 12 billion yuan in industrial and agricultural output value in that year. The completion of the Jinzhou power plant will greatly alleviate Liaoning's electric power shortage and have an important effect on spurring the development of the provincial economy.

Communications and transportation are convenient, because the Jinzhou power plant lies on the vital line of communication between north and northeast China. Here we are still in Liaoning's part of the Daling River Basin, so sources of water are fully adequate. All this has provided beneficial conditions for the power plant's production.



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THERMAL POWER

BRIEFS

ZHENHAI POWER PLANT TAKING SHAPE--Work on the two 200,000-kilowatt thermal generating units in the second stage of the Zhenhai Power Plant construction--a key project of the Ministry of Water Resources and Electric Power and Zhejiang--is being intensified. The construction site is now a bustling scene. Dump trucks, fully loaded with ballast and gravel may be observed moving in a constant stream amid the deafening roar of piledrivers. The footage of piles driven each day is more than double the original quota. Less than 100 meters from the pile-driving site is the pile-making yard, where workers of the prefab plant of the Zhejiang No 2 Construction Company pour concrete at the second, third, and fourth worksites. Working in rotation day and night, they have overfulfilled every month's quota and by 11 July, 3,070 piles had been produced. The preliminary design for the second stage expansion of the power plant was formally approved by the State Economic Commission on 13 August last year, but because of the short construction time and urgency of the work, the preparatory work for the second stage was carried out on a crash basis, so that the work of levelling the site and putting in water, power, and roads could be initially completed in March and the first pile could be driven on 26 March as scheduled. The two generating units will be able to generate 2.8 billion kwh annually, playing a major role in alleviating the power shortage in Zhejiang and the East China region. [Summary] [Hangzhou ZHEJIANG RIBAO in Chinese 30 Jul 83 p 2]

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COAL

GAO YANGWEN UNDERSCORES IMPORTANCE OF S&T TO MODERN COAL INDUSTRY

Beijing ZHONGGUO MEITAN BAO in Chinese 20 Jul 83 pp 1, 2

[Summary of speech by Gao Yangwen [7559 2254 2429], entitled "Rely on Scientific and Technological Progress To Initiate a New Phase of the Coal Industry and To Realize the Doubling of Coal Output," delivered at the National Coal Science and Technology Conference on 8 July 1983]

[Text] First, let the guiding idea move to reliance on scientific and technological progress

Reliance on scientific and technological progress, vigorous economic development, quadrupling gross industrial and agricultural output value by the end of this century--these are major articles of policy as determined by the Party Central Committee. They are now so recognized by more and more comrades on the coal front. There are, however, more than a few comrades who still lack sober recognition and profound understanding of them and think that we "can produce coal in the same old way without stressing science and technology." "After so many years of not emphasizing science and technology, do we not produce 600 million metric tons of coal?" This kind of viewpoint tallies with neither past realities, the coal industry's development trends, nor the laws of social development.

Great industrial production cannot do without science and technology. Without the appropriate science and technology, we could not produce 600 million metric tons of coal. What needs to be faced squarely, however, is that our coal industry's science and technology are critically backward. In mines with standard equipment, including those doing backward ordinary mechanized mining, mechanized mining amounts to only 40 percent. If backward scrappers are included, tunneling and loading mechanization does not even reach 40 percent. Continued reliance in the main on manual production is precisely where our backwardness lies. The "five pressures" that we often talk about--those of output, people, accidents, deficits, and transport--are created by nothing other than this backwardness. These pressures have formed large and heavy millstones around our necks. One example is the millstone of too many people: China's state-run coal mines now have more than 4.6 million people, plus their more than 10 million dependents. The mine must take care of everything from production to domestic needs and from the workers to their children. These obligations, difficult to perform well, exhaust the energy of leading cadres.

Although there are historical and social reasons for the coal industry's backward science and technology and heavy millstones, the important reason is that our coal trades have not valued science and technology. They have looked down on science, technology, and education and discriminated against intellectuals. Also, their conservative thinking, which is content with the existing backwardness, is quite strong. Some comrades have a state of mind in which the spirit that endures backwardness is greater than the spirit of innovative progress. If this problem is not solved, the state will not tolerate it, and every one of us comrades will not be reconciled to it, but more importantly, we will not be able to realize the goal of doubling coal output by the end of this century.

Second, coal science and technology work has had results, but they do not suit the development of the coal industry

Since the 3d Plenum of the 11th CPC Central Committee, coal science and technology work has had new improvements. As we rely on scientific and technological progress to develop the coal industry, people are beginning to understand the idea that science and technology must be geared to the needs of production and construction. The coal industry's new way of development that has tentatively formed in the past few years embodies the idea of reliance on science and technology. Scientific research and education are now classified as strategic focal points. We have begun to correct the mistaken inclination to look down on knowledge and discriminate against intellectuals. Science and technology personnel's roles have begun to come into play. More and more science and technology personnel are devoting themselves to the cause of coal, bravely overcoming difficulties, and making positive contributions. We have begun to strengthen the organization and leadership of science and technology work. By issuing a "Draft Policy of Science and Technology in the Coal Industry" and the "Chief Engineer's Responsibility System," our ministry has set up its own Science and Technology Development Department while establishing and strengthening a consultative committee on technology, a coal institute, an association for coal processing and utilization, and a coal economics committee. Some gains in science and technology have been made: during 1979-82, gains authenticated by top-level state agencies averaged more than 50 per year, twice as many as in the past. A fairly complete set of new products was developed that matched the world levels of the early and middle 1970's. Chinese-made comprehensive mechanized mining equipment has already advanced from the industrial experiment stage to the stage of popularizing its application. There has been new progress in research on the "three downs," i.e., coal mining, special shaft-sinking methods, and techniques of burning and comprehensively utilizing coal and gangue. Science and technology information personnel have supplied much valuable information for key tasks of scientific research and for technology imports.

This is merely a beginning, however. The severely backward state of coal science and technology has yet to change fundamentally; backwardness in science and technology is still a severe problem that hampers the development of the coal industry. It concretely displays four areas of unsuitability.

The first is the unsuitability of the number of gains from scientific research and their quality. A large group of technical problems spawned by production

and construction remain long unsolved. We have to expand the mechanization of excavation, but we now lack coal mining machinery and tunneling equipment. We have not yet developed critically needed machinery for extracting coal from thin seams. We have just manufactured the prototype of a 300-kilowatt high-power coal mining machine, but the tunneling machine has not yet passed its tests. Our shaft-sinking speed is slow, and our shafts and tunnels have a low unit tunneling level. As for raising this speed and that level, there are many problems awaiting science and technology departments. We have many accidents, a high casualty rate, and great losses--scientific research still has few answers to the question of how to change the safety picture. The gains from scientific research are of inferior quality, not advanced, unreliable, and incomplete. Thus the shapeless productive forces cannot play a better role.

The second is the unsuitability of science and technology research capability. The entire coal front has only 10,000 workers and staff members in its scientific research units, fewer than 5,000 of whom are scientific research personnel. Even fewer can independently launch research projects. Needless to say, this is far inferior to the main foreign coal-producing countries; it is also rather inferior to our brother industries in China. Funds for scientific research are insufficient; there is no strength to tackle problems that we ought and want to tackle. The means of scientific research are backward and have many gaps. To this day we have not established ways of testing technical equipment in the areas of safety, washing, open-pit mining, and so on.

The third is the unsuitability of the level and capacity of machine manufacturing. Some critically needed production and consumption equipment we cannot manufacture; we cannot produce enough of other such equipment to meet the demand for it. Product level is not high, new products are few; most are backward products from the 1950's and 1960's. Yearly output is 200,000 metric tons, of which only about 50,000 are accounted for by comprehensive mechanized mining equipment, heavy-duty conveyors, relatively high-power coal mining machinery, and other relatively new equipment. In the vast majority of cases, product performance, service life, and reliability cannot match advanced international levels.

The fourth is the unsuitability of the science and technology work system. What should be concentrated has not been; what should be dispersed has not been. A fairly prominent problem is insufficient concentration due to the lack of a centralized and unified command structure. From scientific research design to manufacturing, imports, popularization, and application, too many leaders cannot coordinate with each other and march forward in concert.

The four unsuitabilities in concentrated fashion reflect the unsuitability of our leading idea: there is no established guiding idea that relies on scientific and technological progress.

Third, raise science and technology work to a level suited to the development of the coal industry.

How should science and technology work be done? Premier Zhao Ziyang has already spoken clearly on this point: such work must be geared to building the economy. This is the guiding idea behind China's science and technology

work. As far as the coal industry is concerned, we must gear ourselves precisely to production and construction. We will study and solve key technical problems, thus obtaining major economic results, and we will strive for the goal of doubling coal output and for the realization of the "five transformations." These are the guiding ideas behind science and technology work in the coal industry.

The strategic objectives of science and technology work in coal are as follows: by the end of this century, the technology in most key mines is to attain the level where the world's advanced countries have been in the late 1970's and early 1980's; some mines, especially large open-pit mines, are to have technology matching or approaching the advanced international levels of that time.

(1) We must solve the two problems of "reliance" and "gearing." Production and construction units have to lay particular emphasis on solving the problem of "reliance." The crux of the solution must be to increase enterprises' inner motive force for reliance on science and technology. At the same time, there has to be an increase of some external pressures, forcing you to adopt advanced science and technology. The leading cadres of production and construction units must establish systems of examination and inspection. Preliminary considerations are of these few questions: first, should we annually come up with subjects for science and technology departments, have them handle a few tasks, and provide them with necessary labor and material resources? Second, should we spread new techniques, equipment, and technology suited to your unit? Third, should we heed the opinions of science and technology personnel on how to accomplish a unit's plans for production and construction and on how they are to play their own roles? Scientific research departments must solve the "gearing" problem. Just as with "reliance," this problem's solution involves the matter of motive force and pressure. These few questions arise from an examination of science and technology departments: first, are scientific research problems the key ones in production and construction? Second, will these problems be solved on time and on the basis of quality? Third, will the gains from scientific research extend to production and construction and will the economic results be good? Fourth, how should technological service work be done? Fifth, will technological democracy play a good role?

(2) The establishment of a coal science and technology management system will strengthen the organization and leadership of coal science and technology work. Science and technology leadership groups will be set up first and will be the coal system's policy-making bodies for science and technology. Second, our ministry will establish a general engineer's office to be the coal system's command mechanism for science and technology. Third, a technology committee will be a consultative mechanism for science and technology. Work in these three areas is inseparably connected and will raise the coal industry's science and technology work to a new level. Fourth, technology development centers will be established one after another for each specialized field and will form a unified structure of scientific research, design, and production.

Provincial bureaus, companies, mining bureaus, and qualified mines must also establish general engineer's offices and general engineer's responsibilities, providing the engineers with posts, rights, and duties.

(3) We must increase the overall capacity for scientific research on coal. We will first substantially strengthen the capacity for scientific research by having planned substantial expansion of scientific research institutes (third-line institutes). Then provincial coal institutes (second-line institutes) will be appropriately adjusted. Mining regions producing over 5 million metric tons and having their enterprises' institutes that are undergoing reorganization will get institutes if they do not have one already. Second, we will strengthen the means for intermediate experiments and tests. Third, we will strengthen science and technology information work.

(4) We must formulate a stable, realistic coal science and technology policy, science and technology development program, and a program of technological transformation. This time, in accordance with the requirements of a new approach to the development of the coal industry, we have proposed a draft policy and program for technology. The main spirit of these two documents is the constant adoption of new techniques, technology, and equipment and the step-by-step arrival of the coal industry at an advanced level of science and technology. Everyone must formulate their own units' technology development program and technological transformation program based on the spirit of these two documents. The latter program must embody the former program's spirit well, since the two must not come apart.

(5) We must establish a science and technology development fund. First, we will increase capital construction investment in science and technology. Second, we will establish a science and technology development fund. Third, we will establish a fund for the trial-production and popularization of new products. Fourth, capital needed by newly built mines and technologically transformed mines for the adoption of new technology and equipment must be incorporated into our planning.

(6) In carrying out further our policy on intellectuals, we will fully arouse the enthusiasm of science and technology personnel. What urgently needs to be done now is the strengthening of the unified management and rational use of science and technology personnel. This will enable existing science and technology personnel to play a better role and to produce more results earlier. All science and technology personnel must also do their duty by contributing their efforts to the modernization of the coal industry.

(7) Advanced experience in and adeptness at learning from China and other countries will spur progress in coal science and technology. We must break the old habit of putting science and technology behind closed doors; take positive initiatives in adopting many methods and in having cooperation between scientific research units in China and abroad; and expand our work on coal science and technology. In learning from abroad, we must pay attention to importing the necessary advanced technology; this is a shortcut to accelerated technological progress. When importing equipment, we will certainly consider creating conditions for domestic consumption and manufacturing.

(8) We will stress the popularization of the results of scientific research. This is an important step in the speedy conversion of these results into productive forces. Departments of scientific research, design, manufacturing,

production, and construction must emphasize popularization work. All results of scientific research that go through industrial testing and prove advanced and reliable must be incorporated into plans and designs and must be popularized.

(9) In the near future we will emphasize key technological problems in five areas: comprehensive exploration technology; rapid shaft-sinking technology; extractive and tunneling machinery; safety technology; and coal extraction techniques.

Fourth, strengthen educational facilities and promote the development of science and technology

The most basic and most important measure to improve coal science and technology is to stress the educational foundation. Coal education has progressed in the past few years, but is not commensurate to the coal industry's position and mission. We must resolutely adopt measures to alter fundamentally the backward state of coal education.

First, we must genuinely place education in an important strategic position. All levels of party and government leadership must emphasize education themselves and view investment in education as even more important than investment in production. Ministry and party organizations have decided that from now until 1990, annual investment in universities, colleges, and technical secondary schools will be two to three times greater than in the past few years.

Second, we must accelerate the expansion and proper administration of coal academies and schools. Such institutions at the post-secondary level will expand to 28,000 students by 1985 and expand by about another 50 percent by 1990. At the secondary level, they will reach the figure of 28,000 students by 1987 and then will progressively expand to 40,000. A number of things must be done: adjust the composition of education and specialized installations; expand the number of graduate students, students at colleges for professional training, and students at technical secondary schools; expand the number of students enrolled in the specialties of coal mining, mine construction, and especially open-pit mining; and increase training capacity in ventilation and safety. In 1990 the number of graduate students will rise from 200 today to about 2,000. We must also adopt measures to handle key schools and disciplines well: raising the level of teachers; improving and replacing educational instruments and equipment; and progressively realizing the modernization of educational methods.

Third, we must adopt many methods and vigorously develop education for workers and staff members. Great effort must go into establishing three "centers," namely, a cadre education center, an audio-visual education center, and a center for training in specialized technology. The Beijing Coal Management Cadre College serves as the educational center for the coal system's cadres; at the same time, Changchun, Taiyuan, Zhengzhou, and Chengdu each will have a regional coal cadre management college or branch college. Preparations are being made for the construction of an audio-visual center for the coal system

at Beijing. Regional audio-visual education centers will be founded at the China, Fuxin, and Shanxi coal academies too. The big mining regions' large enterprises will step by step set up audio-visual education centers for those regions. Renewal of science and technology personnel's knowledge is essential in every area of specialization. Besides post-secondary coal schools' continuing to have special courses for cadres and study courses, a few of these schools and qualified mining enterprises will have centers for training in safety, comprehensive mechanized mining, open-pit mining, comprehensive utilization, and foreign languages. We must open wide the road to learning and operate well our workers' and staff members' colleges; colleges-by-television; correspondence colleges; and sparetime colleges. This will encourage workers and staff members to teach themselves and develop their talents.

Fourth, we must operate well the colleges for workers' and staff members' children in mining regions. Every level of ministerial and coal enterprise organization must emphasize secondary and primary education in mining regions. In our ministry, the main thing is to have investigative research and to help factories and mines solve the relevant problems of raising the level of teachers and of educational quality.

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COAL

#### STRATEGY FOR TECHNOLOGICAL TRANSFORMATION OF SHANXI MINES REVIEWED

Taiyuan JISHU JINGJI YU GUANLI YANJIU in Chinese No 2, 30 Jun 83 pp 58-59

[Article by Hu Zhonggui [7579 1813 6311]: "A Tentative Look at the Technological Transformation of Shanxi Coal Mines"]

[Text] Within the policy of national economic development formulated by the 12th Congress of the CPC, it has been determined that existing enterprises must undergo technological transformation. At the General Meeting of China Science and Technology Awards, Comrade Zhao Ziyang further expounded this viewpoint and put forward a policy for achieving this goal. I shall now discuss some simple facts set forth in Comrade Zhao's speech and the combination of these facts with the actual situation in Shanxi's coal industry.

#### Technological Transformation Is Essential for the Four Modernizations

In a developing economy, should we rely principally on the "extensive" or on the "intensive"? Should we invariably stress important projects and the enlargement of the scale of capital construction or should we base ourselves on technological transformation of existing enterprises and bring their capacities and beneficial results into full play? Since the Third Plenum of the 11th CPC Central Committee, these questions have step by step become clearly defined. With the "intensive" as the key to developing the economy, technological progress has been made, and the idea of the technological transformation of enterprises has progressively established itself. This idea has sprung from China's conditions nationwide and from the actual situation in its industrial enterprises.

If China is to modernize itself, and if it is to realize its grand objective of quadrupling industrial and agricultural output value by the end of this century, then Shanxi's coal industry must produce over 300 million metric tons to ensure basic needs of the national economy's development. This cannot be done on a foundation of old technology, equipment, materials, techniques, and products. Reliance on existing economic and technological norms and levels of management is also out of the question. This contradiction can only be resolved by reliance on technological progress: we must have planned, progressive technological transformation of existing enterprises; work hard to move coal production onto a new technological foundation; and raise all economic and technological norms to a completely new level. Only in this way can we utilize the financial and material resources that we already have to create even more

social wealth. Nor can we otherwise further develop the productive forces, improve economic results, and realize the objective of doubling and then quadrupling.

Some people say that coal is the key to the nation's development and that Shanxi, moreover, is the key to coal's development and gives the nation great support and guarantees in the areas of funds, materials, and goods. Can Shanxi depend mainly on capital construction but not on the technological transformation of enterprises? No, it cannot, no more than the nation can. We can see from state investment in coal energy that in the long-range plans for China's coal and Shanxi's coal, existing mines still carry a great share of the load. In particular, the increase in production over the past decade has been realized mainly by reliance on the technological transformation of existing mines. Even if we had the funds for large-scale construction of new mines, the policy of technological transformation could not be neglected. Just think, if we only paid attention to capital construction and not to technological transformation of existing mines, by the time that a group of newly built, technologically advanced mines had a role to play, preexistent old mines would be as useless as a club pulled apart by a bear. This kind of method is known as the one-fist method. We have to pay extremely close attention to technological transformation and progressively move existing mines onto the track of technological progress at the same time that new mines are being built. Only then can we make two fists and have genuine power.

#### The Main Problems With the Technological Transformation of Coal Mines

In terms of guiding ideas and bases for transformation, the technological transformation that we want now and that of the past differ greatly in conditions, content, and objectives. The technological transformation spoken of now is based on the premise of technological progress. It adopts new technology, techniques, equipment, and materials. It raises product quality, expands product variety, and spurs product improvement and updating. It lowers consumption of energy and raw materials, improves comprehensive social benefits, and realizes expanded production centered around the "intensive." The objective is to work hard to spread in China's existing enterprises before the end of this century the technology already in place in developed countries in the late 1970's and early 1980's, as well as to blaze new technological trails to some extent. As far as Shanxi's coal industry is concerned, it is one of the main bases of China's coal industry and has a fairly good foundation. Hence its demands should be raised somewhat, and it should work hard to catch up to or approach advanced world levels by the end of this century. In accordance with this requirement, it should formulate a policy based on the premise of improving economic results that will uphold safety and production. Shanxi should also insist on mechanization and be able to suit the plans for the technological transformation of the national economy, which demand a coal industry growing every day. In this way it will progressively attain the goal of overtaking advanced world levels. The content of this transformation might roughly include the following five areas:

One, reform of production and development plans and scientific, rational production. Coal mine production is divided into two kinds, underground excavation and open-pit strip mining. Shanxi now has only the first kind. In this

kind of mining, we must certainly pay the closest attention to planning production. From the planning and inspection stages to those of production and construction, we must pay the closest attention to studying development plans and also make every effort to use scientific methods to obtain economically rational results. First, we must improve production technology and methods. We must also work hard to raise the rate of energy recovery and reduce loss of coal energy through waste. Second, we insist upon a policy of excavation and tunneling before anything else. Acceleration of the pace of opening and tunneling will suit the needs of mining coal and ensure the normal continuation of excavation. Third, we will have rational concentration of production, i.e., the timely lowering of the tunneling rate, a smaller number of useless tunnels, lower production costs, and improved economic results.

Two, improved technical equipment and the mechanization of production. Unified distribution mines must have the planned conversion of some of their mining by explosives into mechanized mining. They must also progressively employ high-power coal cutting machines and hydraulic pit prop technology. Step by step and in a planned way, they must develop comprehensive mechanized mining techniques and on a foundation of imports develop an organized system of assimilation. They must suit the needs of the development of mechanized mining and energetically develop mechanized tunneling and conveyance. Local mines should also energetically create conditions for the step-by-step transition from manual production to mechanized production.

Three, improved mine safety conditions and safe, modern production. First of all, we have to improve the conditions of mine safety equipment. Step by step and in a planned way, we must choose advanced technology and equipment from China and abroad to outfit our existing mines. We must also establish sound systems of remote control telemetering in order to control major underground hidden dangers in a fundamental way. We must set up and perfect underground sprinkler systems and strengthen measures to protect against and eliminate dust, so as to improve underground industrial health.

Four, improved communications control, production command systems, and modernized management. Step by step we must adopt new technology and equipment; set up advanced communications and liaison systems; and strengthen production command systems centered around control. We must transform the system of production, storage, and motorized conveyance of coal. In addition to replacing equipment, we must also vigorously invest in intellect. We must strengthen cadres' and workers' cultural education, vocational skills, and technical training; we must also work hard to raise workers' and staff members' managerial and technical levels in order to suit the requirements of managing mdoernized production.

Five, changed operational patterns and improved economic results from enterprises. We must change the unitary operational pattern whereby mines just produce raw coal for selling into an economically diverse pattern of comprehensive utilization involving the development of the coal-washing process. In a planned way we must build a group of coal-washing plants and develop the coal-washing process for the purpose of changing the primacy of marketing raw coal into that of marketing washed and refined coal. We must increase the proportion of coal being washed and the chunk selection rate. In accordance with users'

needs, we must work out a unified product catalog and a concrete variety series so that users can order supplies and so that we can create conditions geared for supply and supply according to specifications. This will also improve economic results for coal enterprises and save energy and transportation for society.

By going through the five transformations above and working hard to bring about the four great changes below, the coal industry will switch from manual production to mechanized production; from an unsafe situation to the ability to control in a fundamental way every kind of hidden danger and accident; from simple production of raw coal to its thorough processing and to many coal products; and from unitary operation to comprehensive utilization and economic diversification. We must work hard to surpass advanced world levels of production technology, administration, and management.

#### Technological Transformation Measures and Relevant Policy

In order to guarantee smooth technological transformation and to attain our desired goal, we must do four things. First we must strengthen coal's scientific research organizations. We suggest the establishment of a science and technology research center in Shanxi to serve the development of the coal industry. The research organizations headed by this center would form a completely integrated coal science research system and strengthen coal research, especially in such areas as mine safety, mechanization, and the coal-washing process. Second, we must strengthen the technical training of workers and staff members. We must establish training centers from top to bottom for all Shanxi and for each mining region. We must formulate a training program. In an organized and planned way, by stages and in groups, we must give workers and staff members technical and vocational training in accordance with the requirements of the four modernizations so that they can skillfully operate modernized machinery and equipment. We must use advanced technology as it develops. Third, we must further implement the policy on intellectuals, which will provide scientists, engineers, technicians, and every kind of intellectual with roles to play. Intellectuals, especially every kind of vocational and technical specialist, are an enterprise's precious wealth. Every level of Party organization and every level of leadership should fully recognize this and cherish this precious wealth. We must create conditions for them in the course of technological transformation, technological innovation, scientific experimentation, and every kind of productive activity. We must make things convenient for them, being concerned and helpful with their lives and letting their intelligence and wisdom play a full role in production and construction. Fourth, we must study and formulate a policy concerned with giving impetus to the technological transformation of enterprises; thus we will give the green light to technological transformation in every respect. We must reform every kind of old rule and old regulation that does not favor technological transformation, and we must study and implement every kind of new policy that encourages technological transformation. For example, there are the following: a policy of funds for special items in technological transformation; a policy of item-by-item investment in and priority loans for technological transformation; a system of leasing equipment for use on a trial basis; a fixed assets fee collection method; a policy of encouraging scientific research units to combine with production organizations to

to tackle key research problems; and a policy of having enterprises energetically conduct scientific research on and industrial experiments with certain items. A series of measures and policies for the purpose of spurring smooth technological transformation and healthy development of enterprises will obtain rather fast, economical, and good economic results.

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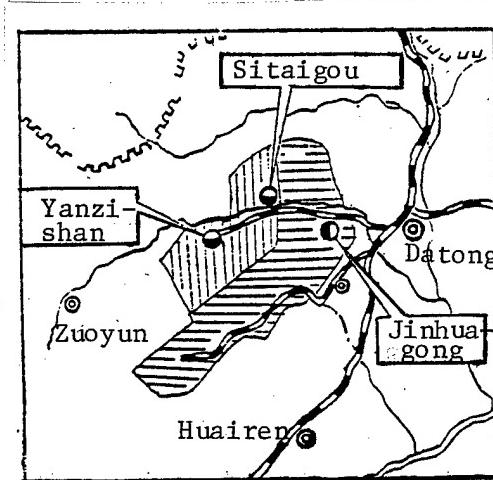
COAL

EXPANSION TO BOOST DATONG OUTPUT TO 32 MILLION TONS BY 1990

Beijing RENMIN RIBAO in Chinese 30 Aug 83 p 2

[Excerpts] The production of the Datong Mining District has already taken on considerable proportions and with the output of coal reaching more than 26 million tons in 1982, it is one of the major mining districts in the nation. In order to meet the demand to quadruple the total value of industrial and agricultural output before the end of the century, the State is accelerating the development of Datong coal. In August 1980, construction began on a large-scale shaft at Yanzishan. This mine, with a designed yearly output capacity of 3 million tons, has exploitable reserves of more than 600 million tons, enough to mine continuously for more than 100 years. Under construction for 3 years now, four of the mine's eight tunnels have been completed. Roads and railroads to the mine are open to traffic and work has already started on the underground transportation system as well as aboveground industrial installations and public facilities. Also under construction are the Sitaigou mines and with an annual designed capacity of 4 million tons, they rival Yanzishan. The construction of these large mines will greatly enhance the face of this old mining district.

While construction of the new mines is being accelerated, the State also plans to begin the expansion of a number of existing mines. When the expansion project for the Jinhuagong mines has been completed, its present yearly output of 1.2 million tons will be increased to 3.15 million tons. Also slated to undergo expansion under the Sixth Five-Year Plan are the three mines of Wangcun, Yungang, and Silaogou, for a net production increase of 4.7 million tons. According to plans, by 1985 the Datong Mining District will be producing 28 million tons of coal a year and by 1990, output will reach 32.9 million tons. After expansion, the Datong Mining District will play a major role in vitalizing the national economy.



- New construction
- Expansion
- Producing mine
- Under construction

CSO: 4013/2

COAL

FACTS AND FIGURES SHOW SHANXI A LEADER IN COAL INDUSTRY

SK301006 Taiyuan SHANXI RIBAO in Chinese 5 Aug 83 p 2

[Text] Shanxi has the most abundant coal reserves of any province. The verified coal reserves of the province amount to 203.5 billion tons, accounting for 30 percent of the country's total coal reserves.

It has the largest coalfield. The Ginshui coalfield of Shanxi Province covers an area of 29,500 square kilometers--the largest coalfield in the country.

It has all the coal varieties. It has every major coal variety one expects to find, including gas coal, fat coal, coking coal, meager coal, anthracite, lean coal, low-volatile coal and jet coal.

It has the greatest number of coal shafts. At present, this province has 14 mines whose products are distributed under the unified state plan with 63 pairs of coal shafts and a total designed capacity of 48.8 million tons; 294 collieries run by prefectures, cities, and counties with a total designed capacity of 23.21 million tons; and some 27,000 commune- and brigade-run collieries with an annual output of 40 million tons.

It has the highest coal output. In 1982, the province as a whole produced 145.31 million tons of coal, ranking first in the country. There are three mining areas and three prefectures and cities each with an annual output of some 10 million tons in the province. Of this, the designed capacity of the Datong mining administration is 14.7 million tons, and its actual output in 1982 came to 26.2 million tons.

It has shipped the largest amount of coal to other provinces. In 1982, Shanxi Province exported 90.35 million tons of coal to other provinces, about 70 percent of the country's total amount of coal transferred from the producing areas to other localities.

The per capita work efficiency of this province is high. In 1982, the per capita work efficiency of the province's collieries whose products are distributed under the unified state plan reached 1.328 tons, the highest figure of all coal producing provinces in the whole country.

The production cost for coal is the lowest. In 1982, the province's collieries whose products are distributed under the unified state plan only required 16.31 yuan to produce one ton of raw coal, Xishan state colliery required 13.27 yuan--the cheapest production cost compared to the same kind of collieries throughout the province.

It has handed the largest amount of profits to the state. In 1982, the provincial coal administrative bureau's seven subordinate coal mining administrations, including the Datong, Yangquan, Xishan, Fenxi, Luan, Jincheng, and Xuangang mining administrations, earned a total of 59.49 million yuan of profits and handed over some 52.4 million yuan of profits to the state, ranking first on the country's coal front. Of this, the Datong coal mining administration handed over 30.75 million yuan of profits to the state, ranking first among all mining enterprises in the country.

CSO: 4013/4

COAL

## YIMINHE OPENPIT MINE PROJECT PROGRESSES RAPIDLY

Beijing RENMIN RIBAO in Chinese 11 Jul 83 p 1

[Article: "First Stage of the Yiminhe Openpit Mine Project Progressing Rapidly; Hulunbuir League Does Everything To Ensure Key Project's Needs Are Met"]

[Text] Since construction of the first stage of the Yiminhe large-scale openpit mine project began, the Hulunbuir League's Party Committee and Government Office have rendered support and assistance in many ways. When the Yiminhe Coal Mine selected a site for its self-provided power plant at the beginning of the year, it disagreed with the local authorities. The site had been surveyed by the local electric power department, and the locality did not approve of the coal mine's plan to construct a self-provided power plant there. While the two sides were arguing about this, the Hulunbuir League Party Committee exhorted the local electricity department to let local interests be superseded in the interests of the whole by yielding the plant site in support of a key project. As a result, the locality did yield the plant site, thus ensuring the needs of the Yiminhe Coal Mine. Construction of the openpit mine at Yiminhe required the building of a feeder railroad from Hailar to the mining area. But the railroad department and the Hailar city government differed over where to lay the tracks; there was still no decision after 3 years of delay. To solve this problem, the Hulunbuir League Party Committee called a meeting of all those in charge of every relevant aspect of the case. In accordance with the needs of the key project, they decided to build the connecting tracks in the outskirts of town; thus was a long-standing problem resolved.

The Yiminhe mining area was originally lush grazing land. Some herdsmen who could not bear giving up this land refused to move while the mine was being built. Zhuoligetulai, the League Party Committee's deputy secretary, impressed on the herdsmen the significance of aiding a key national project. He convinced them that aiding the Yiminhe coal mine project was their duty, and they gladly gave up 82 square kilometers of grazing land and duly received compensation for the requisitioned land in accordance with national regulations.

With the enthusiastic support of the various peoples of the Hulunbuir League, the construction of the first stage of the Yiminhe openpit coal

mine has progressed rapidly. The railway and highway are now completed, and 200,000 square meters of living space have been finished. The No 1 openpit mine has been stripped of 410,000 cubic meters, so its first day of operation has been moved up considerably. The mining area's party secretary, Fang Tong, happily told reporters: "The shortened construction time, the high rate of efficiency, and the rapid progress in the first stage of construction of the Yiminhe Coal Mine have been made possible by the equal contributions of local party committees and local governments."

12465  
CSO: 4013/286

COAL

#### HUATING COAL RATED CHINA'S BEST FOR GASIFICATION

Lanzhou GANSU RIBAO in Chinese 12 Jul 83 p 1

[Article by Lan Yongping and Dong Yongfeng: "Huating Coal Is China's Best for Gasification; Further Developing Its Utilization"]

[Text] Laboratory tests conducted by concerned technical departments both here in China and abroad have shown that coal from Huating in Gansu is China's best coal for gasification and second in the world only to South African coal.

The Huating Mining Area in Gansu was first formally prospected in February 1956. It consists of the two fields at Huating and Anxin, and the verified area of the coal field itself is 118 square km. Its coal reserves total 3.260 billion metric tons. It is a coal base which has rich reserves, fine quality, and a simple [geological] structure with reserves concentrated and advantageous for exploitation.

In order to utilize the resources of Huating coal in a comprehensive manner, appropriate technical departments of the Ministry of Chemical Industry, Ministry of Coal Industry, the Chinese Academy of Sciences, etc., have separately carried out gasification experiments on lump coal and pulverized coal from this field. The results of these experiments reveal that Huating coal has a low ash content, a low sulphur content, is highly volatile, and highly active and is long burning and nonadherant. Its fluidity, thermal transfer, and blending characteristics are excellent. It is at present China's best coal for gasification. Most recently, as a result of laboratory tests on samples conducted by a company in West Germany, Huating coal proves to have an ash melting point only slightly lower than South African coal; other indicators are all higher than South African coal. The general view is that Huating coal is second in quality only to the coal of South Africa in which the activation level is highest, so far as gasification of bituminous coal is concerned.

Preparations to build the Huating Mining District got under way in March 1970, and in April 1979 a mining bureau there was established. Today eight pairs of shafts have been built in the Huating coal field. They have an annual production of 1.8 million metric tons of coal. This supplies the domestic market in seven provinces and cities throughout the country. Since 1980, 10 companies from West Germany, Great Britain, the U.S., Canada, Australia, and other countries as well as from Hong Kong, have entered into negotiations on the mining and purchasing of Huating coal. Further developing the utilization of Huating coal now has a place in our long-term national planning.

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COAL

#### HUOLINHE'S LACK OF SKILLED PERSONNEL IDLES MODERN IMPORTED EQUIPMENT

Beijing RENMIN RIBAO in Chinese 29 Jul 83 p 2

[Article by Zhang Xuanguo [1728 6693 0948] and Lin Wentang [2651 2429 1016]: "Weaknesses in Technology Hamper Progress at Huolinhe Coal Mines; Key Construction Project Needs Help Critically in Every Respect"]

[Text] Editor's Note: Advanced equipment idle because management could not keep up, advanced techniques having to be degraded for want of appropriate skills...the explanation of what has occurred at the Houlinhe coal mines is that this key construction project now needs help critically in technology in every respect.

To solve its technological weaknesses, the mining region must first rely on its own training and second on outside aid. Some of our current key construction projects require the latter more than the former. Some localities and departments have some technical personnel actually trying to do things they have not been trained to do, have been idled and left out in the cold. How can they play their roles fully and how can relevant departments organize them in a planned way to help key construction projects? All relevant departments should pay serious attention to these questions.

In June we arrived at the state's key construction project situated in Nei Monggol's Horqin grasslands--the Houlinhe coal mines. A railroad reaches here while highways radiate in all directions. Vehicles carrying building materials shuttle in and out. Excavators move huge shovelfuls of stripped-off earth and stone. A work force of as many as 10,000 labors intensely. Here, however, there is a problem urgently awaiting solution, namely, construction technology is not fit to build a modernized mining region. The departments in charge of construction hope that all relevant departments will help as fast as possible to solve the problem.

Since 1978, the Houlinhe open-pit coal mines have imported 17 kinds of equipment--817 items all told--costing 190 million yuan, from 8 American, West German, British, Swedish, Dutch, and Japanese companies. This new equipment

and these new techniques require a certain number of appropriately trained engineers and technicians to use and manage them before they can come into play. Such personnel here, however, are few; fewer still are advanced technical personnel. In the current group of engineers and technicians there is not a single senior engineer. Over 90 percent of the mining region's imported equipment is electromechanical equipment, but not one of the seven directors and deputy directors of the departments in charge of the mining region's construction can handle such equipment.

As far as skilled workers are concerned, they cannot fulfill the requirements of a key construction project in either quantity or quality. The Open-pit Engineering Office has 57 imported heavy trucks, each one needs seven drivers. So the office needs 399 drivers all told, but now has only 149. It is understood that skilled workers of grade six or above are required to operate this type of heavy truck. Yet this engineering office has only 1 grade-5 worker and 2 grade-4 workers among its 140 drivers, the majority of whom have just become grade-2 workers. At the mining region's machine repair shops, only eight skilled workers can repair the imported equipment. In one workshop with nine teams, lack of qualified personnel means that team leaders are grade-2 workers, despite the requirement that they be of grade-5 or above.

Owing to technological weaknesses, the mining region cannot scientifically inspect imported equipment on delivery. As a result, equipment of substandard quality has been brought into the mining region. After being used for a short time, it breaks down. Damage of good-quality equipment is also somewhat great because of inferior skills and poor management on top of that; this makes for serious waste. In the parking lot of the mining region's transportation and sales office rests a long line of damaged vehicles. Only 37.2 percent of the equipment imported by the Open-pit Engineering Office is in good condition.

The persons in charge of the Houlinhe Mining Region informed these reporters that they urgently need to bring in a group of middle-aged and young engineers and technicians and that it is rather difficult now to have them transferred from other parts of China. In 1981, Jilin Province allotted this mining region eight college graduates, one of whom did not report for duty. In 1982, the Ministry of Coal Industry gave it another 71 college graduates, but 29 of them did not come. Technicians from elsewhere are unwilling to come while those already at the mining region are ill at ease. Since 1981 this mining region has been drained of 53 engineers and technicians, 2 of whom were assistant general engineers and 14 of whom were engineers.

With regard to engineers, technicians, and skilled workers themselves, a frightfully tough problem has emerged from these conditions. And given the cold climate and relatively inferior living conditions, there is a real question as to how to adopt measures to solve this problem.

Now the Houlinhe Mining Region has already recognized the urgency of strengthening its technology; moreover, it is adopting measures to do just that. Before the present conditions can be changed, however, all relevant departments must make a great effort to help.

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CSO: 4013/304

COAL

#### COAL MINISTRY MOVES TO REMEDY WEAK LINKS IN MANAGEMENT

Beijing RENMIN RIBAO in Chinese 3 Jul 83 p 1

[Article by Huang Fengchu [7806 1144 0443]: "Solving Key Projects' Problems of Bad Management and Inferior Quality; Ministry of Coal Industry Organizes Its Forces and Involves Them Directly in On-the-Spot Inspections and Supervision"]

[Text] The Ministry of Coal Industry has strengthened its work in the area of organizing the leadership of key construction projects in order to solve conscientiously the problem of major waste in those projects that is created by mad management and substandard engineering quality.

The coal system has eight medium- and large-scale projects currently under construction with a planned total production capacity of 50.4 million metric tons of raw coal per year. In order to ensure the smooth construction of these projects and solve existing construction problems promptly, the Ministry and the State Planning Commission jointly formed five work inspection organizations. These organizations inspected construction at the following key projects, one by one: Gujiao and Datong in Shanxi, Houlinhe in Nei Monggol, Yanzhou in Shandong, Pingdingshan in Henan, Tiefa in Liaoning, and Huabei and Huainan in Anhui. Their inspections found that bad management and inferior engineering quality at a few of the projects have affected the construction schedules and caused severe losses of state property.

Since construction of Datong's Yanzishan mine began in 1980, not only have mere 9,500 meters of tunnels been dug, but the vast majority of the tunnels are substandard and require rebuilding. Hence the first phase of the project, originally slated to have a capacity of 2 million metric tons by 1985, will be able to have a capacity of only 1 million at that time. Construction sites at this mining region have been chaotic and losses of goods and materials have been severe. Of the 15 scrapers and loaders used in construction, 4 have been submerged in water in mine shafts while spare parts for 5 others have been broken. Broken and stolen grilles and windows with iron grating alone amount to more than 70,000 yuan. In light of these problems, the Ministry of Coal Industry and the Shanxi Provincial Coal Bureau have reorganized the mining region's leading group and provided it with strong leading cadres.

In view of the eight key projects' current construction problems, the Ministry has put forward a number of measures to accelerate construction in key projects. The four important ones are as follows: first, there have been established command groups in which departments of geology, design, capital construction, planning, supply, and labor participate. These groups will promptly control construction in key projects, coordinate work in every area, routinely supervise, exhort, and inspect, and at regular intervals call comprehensive and balanced meetings. Second, offices have been established at key projects. These will promptly report problems and charge pertinent units with handling them. Third, the eight big mining regions have been provided with touring inspectors who every month will go into the mines to inspect them or will stay on the site to solve existing problems of practical work. Fourth, mine bureaus have established a managerial responsibility system for key projects, and construction enterprises have appointed persons to be in charge of the projects. This system and these appointees will remain with the projects until their completion. The appointees cannot change jobs unless they are incompetent or there are special requirements.

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CSO: 4013/304

**COAL**

**INDUSTRY INSPECTORS TOUR MINES, FIND PROBLEMS AS WELL AS PROGRESS**

Beijing ZHONGGUO MEITAN BAO in Chinese 25 May 83 p 1

[Article: "Inspection Team of the State Planning Commission and Ministry of Coal Industry Finds That of Eight Major Coal Projects, Progress Is Fast on Four, Slow on Four"]

[Text] Construction projects at Yanzhou, Huainan, Huaibei and Huolinhe are making good progress. Some of the projects at Datong, Gujiao, Tiefang and Pingdingshan are making poor progress, reduced to petty squabbles, lacking in design quality and experiencing problems in external cooperation. Measures are being taken to find a rapid solution.

An inspection team sent by the State Planning Commission and Ministry of Coal Industry found recently that of eight major coal projects, progress was fast on four and slow on four: Yanzhou, Huainan, Huaibei, and Huolinhe were the four mining areas showing fast progress and Datong, Gujiao, Tiefang and Pingdingshan were the four where some of the projects were slow. After the results of the inspection were reported to the responsible comrades of the State Planning Commission and Ministry of Coal Industry, the Ministry of Coal Industry took measures to seek a rapid solution of the problems and speed up the major construction projects. This year there is new and continuing construction on 24 deep and open pit mines designed for an annual production capacity of 50.4 million metric tons, which makes up 41 percent of construction in the coal industry nationwide. Of the eight projects, the three located in eastern China: Huaibei, Huainan and Yanzhou, with 11 mines under construction for a designed capacity of 26.9 million metric tons, make up over half of the construction of the coal industry's major projects.

To speed up construction on the major projects, the parties concerned have given vigorous support and the state has given priority assurance in areas such as investment planning and supply of materials and equipment. The annual investment per metric ton of coal on these projects has increased from an average of over 7 yuan in 1979 to 13 yuan this year. This year's planned footage is 24 percent

more than last year's. From January to April, the eight projects completed an average of 20.1 percent of the year's workload with an average of 25 percent of the shaft and tunnel digging completed, which was the fastest progress for the same period of the last few years. Huainan and Huaibei which were not too fast on construction the last few years, reorganized last year, sped up their construction, improved the quality of their projects and by the end of April had completed 28.9 percent of the year's footage plan. Yanzhou, which had been among the faster ones the last few years, completed 30.9 percent. Huaolinhe, which had the first of five large open pit mines to officially begin work, from January to April increased its strip mining 17 percent over the same period for last year and is expected to meet the projected year's stripping goal for the southern open pit mine of 3 million metric tons by the end of the year assuring that it will go into production next year extracting 1.2 million metric tons of coal and reach full production in 1985.

The mining areas of Datong, Gujiao, Tiefa and Pingdingshan where, as previously mentioned, some of the projects have shown relatively poor progress, have recently reorganized their construction work forces, reconstituted their leading groups and, it is hoped, will speed up their projects.

The main responsible comrades from the Ministry of Coal Industry, after hearing reports on problems of some projects bogged down in petty squabbling, problems of slowly produced and poor-quality design drawings, problems of external cooperation, such as providing electric power, moving villages from one place to another and buying land, and problems of some projects showing slow progress and poor quality, have adopted measures to seek a rapid solution and assure the smooth progress of the construction projects.

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CSO: 4013/265

COAL

EDITORIAL PROPOSES SIX-POINT PROGRAM TO RECTIFY INDUSTRY ILLS

Beijing ZHONGGUO MEITAN BAO in Chinese 25 May 83 p 1

[Editorial: "Let Us Work Without Letup and Once and for All Deal With the Major Construction Projects"]

[Text] The state and party have attached great importance to the development of the coal industry. Of 70 major construction projects recently announced by the state, the coal industry accounted for eight. There are 24 mines under construction in these eight major mining areas designed for a total annual production capacity of 50.4 million metric tons, which make up 41 percent of coal construction nationwide. Getting the major coal projects done is a prime undertaking bearing on the overall situation of the national economy with extremely important strategic significance in laying a foundation in the eighties for a vigorous development of the economy in the nineties, double the output of coal by the end of this century and assure the goal of quadrupling the gross national annual value of industrial and agricultural output.

To ensure the construction of the major coal mining area projects is in the essential interest of the state and people and we must master it without a day's delay. As viewed by the inspection team from the Ministry of Coal Industry and State Planning Commission, the situation of the eight major projects has, on the whole, shown progress. The footage completed this year has been the most for the same period of any of the last few years. However, the progress on some projects has not been so ideal. In isolated cases, mining areas have not truly mobilized and act lackadaisically. Some construction projects are still bogged down in petty personal squabbles. Some projects still hold to obsolete methods of design, construction and management without a spirit of thorough reform.

How shall we deal with the major mining area construction projects?

First, we must mobilize ideologically and politically, enabling the cadres, workers, engineers and technical personnel to recognize clearly in an ideological way the position and role of the major construction projects in the national economy, define explicitly the demands imposed on the major projects for the building of the four modernizations, rouse a revolutionary spirit, unite and cooperate, work without letup, overcome difficulties, set high standards and strict requirements, and once and for all, build the major mining areas into model mining areas.

Next, we must implement the responsibility system. Each unit participating in the major mine construction projects must explicitly define its own responsibility in the major construction projects, carry out the system of contracts in all its forms, praise and reward the tasks that are fulfilled, and criticize and penalize those that are not until economic responsibility has been implemented.

Third, we must strengthen on-the-spot command and control. The design units must have people who will become deeply involved at the site, solve problems whenever they are found, and assure the quality and progress of the major mining construction projects. Supply personnel must assure prompt supply of materials and equipment to the site without delay. The leading bodies at all levels must send leading cadres and workers to stay at each of the major mining areas to supervise and inspect, investigate and study, and coordinate and solve problems.

Fourth, we must consistently practice the spirit of reform. Design must be reformed. Construction must be contracted for. Labor and wages must adopt new methods. The entire mine construction project must follow the three lines of division of production, serving production and serving the standard of living. We must open up a new road and abandon the old one. We must use new techniques, technology, equipment and management methods, and speed up construction.

Fifth, we must have a sense of urgency and must make the best use of our time. Each major mine construction project must have a progress schedule. We must make overall plans and arrangements for each engineering project in accordance with the theory and methods of systems engineering, carry out the construction in accordance with the progress schedule and assure completion on time.

Sixth, we must learn from and catch up with the advanced, and launch emulation campaigns. We must launch emulation campaigns to establish the superior construction sites and rank the units, popularize advanced experience, provide advanced models and criticize backward phenomena.

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CSO: 4013/265

COAL

BRIEFS

WORK ON WANGJIAYING ACCELERATED--Begun in May 1978, this mine now boasts of 905 meters of shafts, 840 meters of auxiliary shafts, and 690 meters of ventilation shafts. The underground tunnel network has been basically completed and the work of installation in the auxiliary shafts is being intensified. This modern mine, entirely Chinese-designed and built, has a designed annual output of 1.2 million tons with a service life of nearly 100 years. According to plan, it should be operational in 1987. Construction of this coal mine will play an important role in stabilizing the annual coal output by the bureau at 10 million tons, and in doubling the national coal output. Despite cut-backs in capital construction outlays, funds for this project, a national key construction project, have been guaranteed. Every effort is being made to put this mine into production 1 year ahead of schedule. [Summary] [Shenyang LIAONING RIBAO in Chinese 29 May 83 p 1] 9411-R

KAILUAN EXPANSION--Shijiazhuang, 9 Oct (XINHUA)--Work is now under way to expand the Kailuan coal mines in Hebei Province, the second largest coal center in China. The mine's annual production capacity will be increased by 7.4 million tons. Two new mines are being built and one existing mine expanded in the Kailuan coal field, which encompasses the city of Tangshan and several neighboring counties. A feeder railway line, a transformer station and a plant to wash 4 million tons of coal a year are also under construction. The new coal washing plant will be China's biggest, according to a spokesman for the Kailuan mines. The Kailuan mines were crippled in August 1976, when an earthquake registering 7.8 on the Richter scale occurred in the Tangshan area. Production was restored 1 year and 5 months after the shock. Kailuan produced 19.95 million tons of coal last year. [Text] [OW090742 Beijing XINHUA in English 0712 GMT 9 Oct 83 OW]

CSO: 4013/16

## OIL AND GAS

### FULL EXPLOITATION OF OFFSHORE OIL AND GAS EXPECTED SOON

Shanghai SHIJIE JINGJI DAOBAO in Chinese 4 Jul 83 p 6

[Article by Chen Weixi [7115 5633 6007] and Chen Minwei [7115 3046 3634]: "Complete Exploitation of Offshore Oil Resources"]

[Text] Main Direction of Attack--Reserves of at least 40 billion barrels.

Since the early 1960's, Chinese geologists and petroleum workers have carried out extensive offshore geophysical prospecting acting independently and using their own initiative efforts, and discovered seven oil and gas bearing basins--Bohai, the southern Yellow Sea, the East China Sea, the Pearl River mouth in the South China Sea, Beibu Wan and Yinggehai, also in the South China Sea, and the Taiwan shallows--with a total area of approximately 1 million square kilometers. These basins have Cenozoic deposits of thicknesses ranging from 5,000 to 10,000 meters and good conditions for the formation and storage of oil. There is also a large number of large and medium-size structural zones favorable for oil deposits. The Bohai basin, a number of high-yielding oil and gas wells have been sunk and three oil-drilling platforms have been constructed. In the southern Yellow Sea basin, there are more than 40 structural zones with oil and gas reserves and a deposit thickness of more than 5,000 meters. In 1974-78, after sinking eight test wells, good prospects for oil and gas extraction were confirmed. Industrial oil and gas were also discovered in the basins of Beibu Wan, the mouth of the Pearl River, and Yinggehai. According to the estimate of the vice president of the First National City Bank [of New York], our offshore oil reserves are at least 40 billion barrels. A look at the distribution of potential oil resources in our country shows better prospecting opportunities in the eastern land region, while the western region and the ocean remain reserve regions of oil resources. However, if we compare the working conditions, the exploitation of offshore oil would be of greater help to the acceleration of the four modernizations than the exploitation of the oil resources in the northwest. Therefore, the exploitation of offshore oil should be the main direction of attack in our oil industry development.

The New Stage--Cooperation With Foreign Countries in Prospecting and Exploitation

Since the adoption of the open-door policy, we have signed agreements with 48 oil companies in the United States, France, England, Italy and nine other

countries for geophysical prospecting in the South China Sea and the southern Yellow Sea. In little more than a year, a score of seismic prospecting ships completed a seismic survey line and the processing and interpretation of seismic data. These data confirmed the results of our previous investigations, showing the geological structure of the South China Sea and the southern Yellow Sea and the conditions of formation and deposit of oil and gas, and further revealed the prospects of oil exploitation in these sea areas.

We have signed contracts with oil companies of Japan, France, and the United States for oil prospecting and exploitation in the Bohai, Beibu Wan, and Yinggehai basins. So far, China and Japan have sunk eight test wells in three different structures in the Bohai, five of them yielding 300-1,000 or more tons daily. The first well on the 34-2 structure in the Bohai, on which drilling was completed in mid-February, now yields 1,600 tons of crude oil and 190,000 cubic meters of natural gas daily. The specialists believe that this is further proof of the abundance of oil and gas resources in the southern part of the Bohai and that commercial exploitation can be carried out in 1984. Drilling of the first test well in the prospecting and exploitation of oil and gas resources in the Yinggehai basin through Sino-American cooperation also formally began in January this year. Hong Kong and Macao newspapers have said: "There are very good prospects that regular production can begin in 1985."

At present, production organs and service facilities are being set up in earnest in the Zhangjiang prospecting base in the western South China Sea and in the Shenzhen and Chiwan prospecting bases in the eastern South China Sea. Commenting on oil prospecting in the world and on oil exploitation in offshore areas in 1983, Japan's SEKIYU KEIZAI ZASSHI No 3, 1983 rated the South China Sea among "the most active sea areas for prospecting" and believed that it "has tremendous oil potential."

#### The East China Sea Compares Favorably With Saudi Arabia in Oil Reserves

There is a huge Cenozoic sedimentary basin in the sea area of the East China Sea. Compared with other sea areas in our country, the geological structure here is superior and the oil deposits more long-lasting.

The East China Sea is located east of Fujian and Zhejiang Provinces. In the north, it stretches from the mouth of the Chang Jiang to Jizhou Island. In the south, it extends from Guangdong's Nanao Island to Taiwan's Eluanbi. It has an area of 770,000 square kilometers. The East China Sea continental shelf is a natural extension of continental China toward the bottom of the sea. It is broad in the northeast, the broadest portion being 550 kilometers southeast of the mouth of the Chang Jiang. It is narrow in the southwest where it is flat, fans out, and slants slightly eastward. The East China Sea basin with oil and gas deposits is approximately 500,000 square kilometers in area, more than the grand total of China's famous Songliao Basin and the North China Basin. The deposit is thick, since for millions of years it has served as a receptacle for huge quantities of silt and organic matter washed down by four long rivers--the Chang Jiang, Qiantang Jiang, Ou Jiang and Min Jiang. The Chang Jiang alone brings 500 million tons of silt and 200 million

tons of soluble matter into the East China Sea each year and the volume of this silt is equal to the grand total in the famous Nile, Amazon and Mississippi rivers. The flow of such a huge quantity of soluble matter into the East China Sea has resulted in a layer of sedimentary rock more than 10,000 meters thick. This is a favorable material condition for the formation, accumulation and preservation of oil. Furthermore, in the long course of geological evolution, many geological structures, broad in scope, complete in form, and favorable for oil and gas deposits, have been formed. In the opinion of foreign geological specialists, such geological structures are rather rare. That is why the East China Sea Basin has attracted the keen interests of Chinese and foreign experts for a long time. Based on the preliminary seismic prospecting report in the middle of Changyuan in eastern Zhejiang, (Te-de-fen-de) of the United States said that the conditions of oil and gas here are "very encouraging and show that there may be huge oil deposits to match those of the Middle East." Ikenabe, president of Japan's Oil Development Co. Ltd adds that: "The East China Sea's oil potential compares favorably with that of Saudi Arabia."

In 1972, seven layers of oil deposit and five layers of natural gas deposits were discovered in a test well at a depth between 860 and 3,000 meters at the northern edge of the East China Sea Basin west of Japan. The shallows near Taiwan Island, at the southern edge of the basin have been producing oil since 1904, hitting a peak yield of 4,000 barrels a day in 1977. From this, there can be little doubt that more oil and natural gas will be discovered in this basin.

#### Good News--The Day of Exploitation and Utilization Should Not Be Distant

Since 1974, we have carried out comprehensive geophysical surveys, including airborne magnetic surveys, on the oceanic geology in the East China Sea, mainly for oil. We have not only ascertained the sequence, thickness and distribution of the sedimentary layers, but also defined the features of structures and a large number of anticlinal structures containing oil and gas in the basin. In 1981 and 1982, the drilling platforms of the Ministry of Geology and Minerals and the Ministry of Petroleum Industry, drilled three test wells and discovered many layers of high-pressure natural gas and oil sands and good natural gas currents. From 17 January 1982 to 17 April 1983, the drilling platform "Kantan No 2" of the Ministry of Geology and Minerals drilled a test well more than 4,600 meters deep in the Pinghu structure of the basin, and found the industrial oil flow and natural gas current. Thus the crude oil and natural gas slumbering in the seabed for millions of years will finally be brought up to serve mankind. This proved the abundance of oil reserves in the East China Sea and the good prospects for exploitation of oil and gas resources in the basin, adding a new chapter in the history of general surveys for oil and gas in the East China Sea.

Offshore oil prospecting and exploitation in China is still in the initial stage. In the vast sea area from Bohai and the Yellow Sea all the way to the South China Sea, we can see large numbers of geophysical prospecting vessels day and night, and tall drilling platforms busily operating above the roaring waves. The jack-up and semi-submersible drilling rigs now under construction

in the Dalian, Shanghai, and Huangpu shipyards will soon be at sea to carry out production, while the oil prospecting bases in Tanggu, Shanghai, and Guangzhou will be scenes of intense activity. News of "gratifying new development" in offshore oil prospecting is continuing to pour in, and the time of all-round exploitation and utilization of offshore oil resources is not far away.

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## OIL AND GAS

### BRIEFS

SHANDONG OIL OUTPUT--In the first 9 months of 1983, the Shengli oil fields in Shandong Province scored a 1.46-million-ton (or 12 percent) increase in their crude oil output over the figure of the corresponding 1982 period. The Shengli oil fields now have a daily capacity of more than 52,000 tons. [Excerpts] [Jinan Shandong Provincial Service in Mandarin 2300 GMT 4 Oct 83 SK]

NEW OIL FIND IN LIAONING--The Liaohe oil fields in Liaoning Province have discovered new oil deposits in Liaozhong and Dengta counties. At present, 119 wells have been drilled and more than 90 wells oozed crude oil suitable to industrial usage. Their daily output was from 15 to 20 tons. In addition, natural gas was discovered among the deposits. [Summary] [Shenyang LIAONING RIBAO in Chinese 17 Sep 83 p 1 SK]

KARAMAY STEAM INJECTION--Urumqi, 9 Sep (XINHUA)--A thermal technique for extracting thick crude oil has been tried out with initial success at Xinjiang's Karamay oilfield. This technique involves injecting a certain amount of hot steam into the oil well to reduce the viscosity of very thick oil so that it can be readily pumped out. Geologists estimate that Karamay oilfield has a reserve of approximately 1 billion metric tons of thick oil. In one experiment conducted at the oilfield, after 2,000 metric tons of steam had been injected into an oil well, oil could be extracted continuously for some 20 days with an average daily output of 16 metric tons. Following this, more steam was injected, and oil extraction could be continued for some 30 additional days with a similar output. Experiments with this new technique are being continued at this time. [Excerpts] [Beijing XINHUA Domestic Service in Chinese 0053 GMT 9 Sep 83 OW]

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## NUCLEAR POWER

### VILLAGE OF DAKENG CHOSEN AS SITE FOR GUANGDONG NUCLEAR POWER PLANT

Guangzhou YANGCHENG WANBAO in Chinese 23 Jul 83 p 1

[Article by correspondent Gong Zhijin [7895 1807 3866] from Shenzhen: "Ideal Site for Guangdong's Nuclear Power Plant Chosen After Week-Long Deliberation by Experts From 17 Units in the Country"]

[Text] Shenzhen--After a week-long deliberation, 48 specialists and engineers from 17 units in the country have chosen a fairly ideal site for Guangdong's nuclear power plant. The appraisal ended yesterday afternoon.

As reported earlier, the State Economic Commission held a meeting in Guangzhou in February this year, tentatively choosing a site for the nuclear power plant from two sites: Dakeng on Dapeng Peninsula's Daya Bay, and Lingjiaoshi. After the meeting, the Guangdong Provincial Electric Power Survey and Design Academy, which is responsible for the actual site selection, bored 50 holes in the vicinity of these two sites and collected the date on them relating to the geology, hydrology, tide movement, water temperature, and so forth. After examining these data and conducting on-the-spot surveys, the specialists and engineers invited to participate in the appraisal conducted a comprehensive comparison of the technical and economic aspects and unanimously agreed on the choice of the area east of Dakeng village on Daya Bay as the nuclear power plant site.

Here, the geological conditions are good, the load-bearing capacity is high, water is easily obtainable and can be cooled through recycling, and the population in the vicinity is small. The geological stability and conditions of environment protection and engineering as well as other basic factors are all suitable for the site of a nuclear power plant.

A responsible person of a relevant unit told the correspondent that the choice of site is an important step in the construction of nuclear power plant. Since the feasibility study in the construction of the plant, Guangdong Province has spent more than 3 years in choosing the ideal construction site. This means that the construction of Guangdong's nuclear plant has passed the stage of planning and into the stage of action.

Peng Shilu [1756 1102 4389], vice minister of the Ministry of Water Resources and Electric Power and Liu Junjie [0491 0193 2638], vice governor of Guangdong

Province, made special trips to Shenzhen to hear the appraisal and to praise the work of the experts. In addition to the relevant units of Guangdong Province, the Ministry of Water Resources and Electric Power, the Ministry of Nuclear Industry, and other units of the central government also sent their engineers to participate in the appraisal.

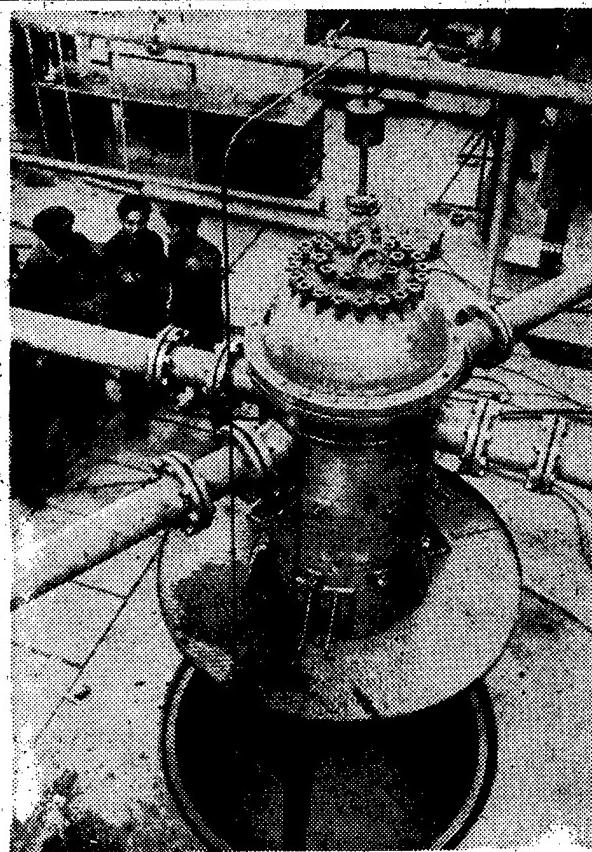
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NUCLEAR POWER

PREPARATIONS UNDER WAY TO BEGIN CONSTRUCTION OF ZHEJIANG NUCLEAR POWER PLANT

Hangzhou ZHEJIANG RIBAO in Chinese 27 Aug 83 p 1

[Photograph and caption]



China's nuclear power industry is on the march. The Zhejiang Nuclear Power Plant is now in the construction preparation stage. The Ministry of Nuclear Industry has joined forces with domestic organs to tackle key problems and to accelerate the initial phase of construction on the plant. Shown above are project personnel conducting a water pressure simulation test on the loop of the reactor pile.

CSO: 4013/332

## SUPPLEMENTAL SOURCES

### NATIONAL EXHIBIT STRESSES USE OF METHANE, FUEL FORESTS, SMALL-SCALE HYDROPOWER

Chengdu SICHUAN RIBAO in Chinese 17 Jun 83 p 2

[Article by Shi Yunyu [4258 7291 3768] and Wang Jiyuan [3076 4949 0955]: "Promoting Agricultural Modernization by Creating Rural Energy Resources--A Visit to the National Rural Energy Exhibit"]

[Text] These reporters recently saw the National Rural Energy Exhibit in Beijing and were much enlightened by it. They were impressed by the extent to which the rural energy problem affects agricultural production, the peasants' lives, and the modernization of agriculture. Sichuan should pay even more attention to this problem, especially since it is a populous province with a serious shortage of energy for agricultural production and domestic use.

The National Rural Energy Exhibit, held in two spacious rooms in the Agricultural Exhibition Hall, used many models, charts, pictures, and physical displays to show people the state of China's reserves of every sort of energy, their distribution, research and testing, development, utilization, and popularization. It also showed new technology for and new experience in the conservation of rural energy. On the square outside the Hall there were demonstration exhibits. All this gave people a profound impression: Although rural energy supplies are seriously deficient now, and there is great waste of energy, China's rural energy resources are still abundant, multifarious, and widely distributed. Plenty of experience has already been accumulated in the areas of rational development, utilization, and conservation of energy. Provided there are measures suited to local conditions, greater mutual aid capability, comprehensive utilization, and attention paid to the guiding principle of practical results, there will exist all the conditions for the solution of the rural energy problem.

The charts in the Exhibit's halls indicated that China's rural energy consumption makes up no small proportion of total energy consumption and that energy for domestic use represents the bulk of rural energy consumption, depending mainly on burning straw, firewood, and other organic fuels. Large consumption of bioenergy creates crop straw that cannot be put back into farmland, and the soil nutrients and organic matter cannot be replenished. Excessive felling of its trees seriously damages a forest's

regenerative ability and leads to soil erosion caused by sandstorms, aridity, flooding, and waterlogging, and by the conversion of soil to sand. The damage suffered by agriculture's ecological environment, moreover, worsens day by day. This warns us that we absolutely cannot treat lightly the disastrous effects caused by large-scale consumption of bioenergy. The solution of the rural energy problem lies particularly in the question of rural energy for domestic use. We must start with the reality of the situation: attaching extreme importance to the rational utilization of natural energy resources in the countryside will spur the transformation of the ecological environment from a vicious circle to a beneficial one.

How are we, after all, to solve China's problems of energy for domestic use in the countryside? The Exhibit placed the popularization of marsh gas in a prominent position. A chart of the current composition of energy for rural domestic use showed that marsh gas still makes up less than one percent. Yet it took up one of the two halls used by the Exhibit. There the Exhibit displayed the history and new development of China's marsh gas; the utilization of marsh gas, its water, and its residue; the nutrient content of marsh gas fertilizer; the principles and technology of marsh gas fermentation; and the scientific management of marsh gas. In addition, China is conducting a marsh gas technology study group for the UN's Environment Program and Food and Agricultural Association, and foreign friends are coming to China's countryside to investigate conditions for the use of marsh gas. These are two extremely significant facts. In the movie auditorium set up for the Exhibit, the main fare was films popularizing marsh gas. Outside the Exhibit's halls two model marsh gas pits were set up. With leaves, weeds, and night soil from inside the halls for raw materials, the gas produced by fermentation went straight to the interior of the halls. While we were visiting the Exhibit, a guide from Nanchong in Sichuan, without any trouble struck a match and lit the marsh gas. Within 10 minutes a big pot of water had boiled for our entertainment.

Chinese and foreign spectators came from the Exhibition Hall to watch with great interest. Marsh gas is energy made by using straw and human and animal night soil for raw materials. By changing the several-thousand-year-old backward process of directly burning bioenergy, it has brought about the rational utilization of bioenergy. It can, moreover, be regenerated; hence its energy will not be exhausted. Its production and use may be dispersed; transport over long distances is not necessary; the gas is clean, sanitary, and non-polluting--with these and other characteristics it will certainly become one of the main ways of developing energy in China's countryside. According to data and statistics on display at the Exhibit, rural China's yearly amount of animal and human waste and crop straw is enough to produce 122.5 billion cubic meters of marsh gas per year if all of that amount is used for that purpose. If half that amount is used, annual production will exceed 61.2 billion cubic meters and be able to meet domestic fuel needs for eight months in the countryside. Of course, because the popularization of marsh gas is restricted by technological capability, economic conditions, materials for making pools, and the level of management, there are still some scientific and technological

problems awaiting further study and solution. Thus the goals mentioned above cannot be realized in a short time. Nevertheless, we should maintain a positive attitude about popularizing marsh gas, which we should develop steadily. The Exhibit demonstrated that in the past few years, nationwide development of marsh gas has had new expansion and that a remarkable rise in gas quality has occurred. Provinces in east and south-central China have made rather great headway while provinces and autonomous regions in border regions and in the nationality areas are actively running pilot projects. China now has 6 million marsh gas pools, over half of which are in Sichuan. Comrades engaged in marsh gas work nationwide said to us: you in Sichuan were the first to popularize marsh gas and have built the most pools; marsh gas development in Sichuan is the key, and if Sichuan does it well, it will push the whole country forward. Some comrades who are engaged in marsh gas work in Sichuan and were visiting the Exhibit together, replied: marsh gas development in Sichuan is excellent, and although there are still more than a few problems, they hope that the higher authorities and brother provinces will support and help them more. It is understood that Sichuan now has a fair number of marsh gas pools that either have low productivity or have not begun operating yet. How will these pools' results be improved? This is a question that demands prompt solution by further consolidation and development of marsh gas and that is well worth serious attention everywhere.

Judging from the Exhibit, we could see that although there has been great progress in popularizing marsh gas, coal, oil, electricity, and natural gas are already widely used. The reality in the countryside, however, shows us that firewood occupies an important position in rural energy consumption now and will continue to do so. Therefore, merely from the point of view of solving the rural fuel problem, putting great effort into tree planting and afforestation also has a particularly important significance. As illustrated by advanced models on display--including the Feibo Forest on both banks of the Dongxi He in Liangshan Yi Autonomous Prefecture, the seedling forest on Mount Feng in Bazhong County (both forests are in Sichuan), and others--well-done afforestation and forest protection not only can greatly improve the ecological environment but can also readily solve the problem of burning firewood. According to plans, in the next decade China will plant 12.5 million hectares with trees for firewood, a total of 7.5 billion trees. When ready for logging, these trees can supply 170 billion kilograms of fuel per year, nearly equivalent to twice the amount of firewood normally used now. The former figure is quite impressive. The Exhibit displayed charts indicating that since the Third Plenum of the 11th CPC Central Committee and in the wake of the implementation of the forestry policy, there have been great achievements in the stabilization of forest rights, the expansion of private mountains, and the flourishing of the afforestation movement. But to this day more than a few localities in Sichuan still have rather many barren hills and slopes that are suitable for trees but await afforestation. As long as policy restrictions are further relaxed, and the enthusiasm of millions and millions of peasants is kindled to develop and use barren hills and slopes for planting trees and then protecting them, the rural firewood problem will not be hard to solve.

The small-scale hydropower displays at the Exhibition Hall also drew many visitors. Charts of the distribution of hydroelectric resources showed that more than a few of China's provinces and autonomous regions have an abundance of such resources, with the southwest region having the richest. Sichuan's small-scale hydroelectric capacity is more than 12 million kilowatts and more than 5.8 million can be exploited. Excluding Tibet, Yunnan, and some other provinces and autonomous regions, Sichuan leads the inland and coastal provinces in small-scale hydroelectric reserves and in exploitable small-scale hydroelectricity. At the end of last year, China's total installed capacity of such hydroelectricity exceeded 8 million kilowatts, while that of Sichuan exceeded 1 million, more than any other province or autonomous region. Yet because of Sichuan's vast rural areas and population, rural electricity consumption levels are still low. Among the Exhibit's advanced models for counties, Yangshan in Guangdong and Hengdong in Hunan each have small-scale hydroelectric installations that exceed 20,000 to 30,000 kilowatts. Except for one or two counties with more than 20,000 kilowatts, Sichuan's few counties with rapidly developing small-river hydroelectricity generally only have more than 10,000 kilowatts. As we viewed the Exhibit, we felt strongly that small-river hydroelectricity is a clean, cheap, renewable, and multi-dimensional energy resource that can suit the special dispersed nature of rural energy resource that can suit the special dispersed nature of rural energy use. Hence it occupies a particularly important position in the development of rural energy. China now has some counties that use electricity for cooking, lighting, heating, threshing, and drying. Sichuan is using electricity in place of firewood only in its three autonomous prefectures. It appears that the province's relevant departments have a problem worth studying and solving: how to accelerate the development of small-river hydroelectricity and supply such electricity to peasants for domestic use.

In the area of rural energy development, the Exhibit also revealed this to people: the construction of small coalpits by production teams cannot be neglected. As for new forms of energy like wind energy, solar energy, geothermal energy, and others, although they are now at the research and experimental stages, we see good prospects in models that have had early experiments and results already. It is very worthwhile to draw lessons from this in Sichuan's three autonomous prefectures--Ganzi, Aba, and Liangshan--that have these new energy resources.

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